AMERICAN
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Sixth in a Series——

FURTHER STEPS IN THE DEVELOPMENT OF AN ACCELERATED LABORATORY TEST FOR CHLORINE-RETENTION PROPERTIES IN RESIN-TREATED FABRICS*

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Texas State College for Women

Ellen H Richards Institute
School of Chemistry and Physics
The Pennsylvania State College

This is the sixth in a series of reports on chlorine retention by textile finishes, sponsored by the American Viscose Corporation through a fellowship conducted at the Ellen H Richards Institute, School of Chemistry and Physics, The Pennsylvania State College; and the College of Household Arts and Sciences, Texas State College for Women.

INTRODUCTION

An earlier study by Wham (*1*) of the chlorine-retention properties of various resin finishes used on rayon fabrics reported the results of three concentrations of chlorine bleach solution, combined with pressing at 400° F intermittently for a total of 30 seconds, using a hand iron, as a contribution toward the development of an accelerated chlorine retention test.

Reports by Wham and Mack (*2, 3, 4*) indicated the value of light as a part of the accelerated test for this factor. In order to combine light with a laboratory chlorine-retention test, the accelerated chlorine retention procedure previously described by Wham (*1*) was followed in this study with the elimination of pressing, and the addition of light as the variable factor in strength determinations. Experimental pressing then was included for the evaluation of fabric yellowing, but was not used in the series of tests for strength changes.

* This report covers research work conducted in major part at the Ellen H Richards Institute, School of Chemistry and Physics, The Pennsylvania State College, while both authors were staff members at the Institute, and concluded after Dr Wham joined the faculty of the Texas State College for Women.

TABLE I

PERCENTAGE CHANGE IN DRY BREAKING STRENGTH AFTER DIPPING IN CHLORINE SOLUTION AND EXPOSED OR NOT EXPOSED IN FADE-OMETER*

Fabric	Unexposed Warp	Unexposed Filling	Exposed 20 hours Warp	Exposed 20 hours Filling	Exposed 40 hours Warp	Exposed 40 hours Filling	Exposed 80 hours Warp	Exposed 80 hours Filling
0.015 Percent chlorine concentration								
#1—control	+1.7	4.4	11.0	13.9	14.8	4.4	35.2	11.2
#1—melamine	2.8	+2.5	23.8	13.5	18.3	11.4	2.3	+3.5
#2—control	11.0	3.6	12.0	10.5	20.0	8.7	30.6	18.1
#2—melamine	13.9	11.4	26.9	15.2	16.8	16.6	25.9	11.8
0.13 Percent chlorine concentration								
#1—control	11.8	9.5	12.3	14.1	21.6	11.6	33.9	29.7
#1—melamine	19.3	17.4	35.8	20.8	39.0	25.1	49.6	18.8
#2—control	17.4	21.5	31.1	18.8	28.9	23.3	39.6	23.5
#2—melamine	28.4	13.9	30.8	15.4	39.9	24.6	45.7	34.1
0.5 Percent chlorine concentration								
#1—control	60.6	41.1	62.3	48.2	66.1	57.2	68.2	62.3
#1—melamine	58.7	48.6	61.5	68.1	67.0	64.6	70.6	73.0
#2—control	57.8	38.0	66.9	45.0	71.5	47.4	74.0	53.5
#2—melamine	59.6	52.1	65.4	56.6	69.7	63.2	75.5	66.6

* All values are negative except those marked (+).

TABLE II

PERCENTAGE CHANGE IN WET BREAKING STRENGTH AFTER DIPPING IN CHLORINE SOLUTION AND EXPOSED OR NOT EXPOSED IN FADE-OMETER*

Fabric	Unexposed Warp	Unexposed Filling	Exposed 20 hours Warp	Exposed 20 hours Filling	Exposed 40 hours Warp	Exposed 40 hours Filling	Exposed 80 hours Warp	Exposed 80 hours Filling
0.015 Percent chlorine concentration								
#1—control	+1.8	0.3	0.0	3.4	15.5	0.3	35.5	36.9
#1—melamine	6.8	+1.8	14.5	19.9	19.6	14.1	34.2	23.0
#2—control	14.6	17.0	6.7	10.8	23.6	9.4	37.1	36.8
#2—melamine	12.5	11.6	17.7	17.5	26.0	1.1	39.6	11.6
0.13 Percent chlorine concentration								
#1—control	23.6	0.3	29.1	16.4	34.5	24.2	44.5	54.1
#1—melamine	41.9	37.1	61.5	62.6	71.8	76.1	82.1	75.2
#2—control	14.6	28.7	31.5	17.5	25.8	31.8	42.6	39.0
#2—melamine	59.4	41.3	64.6	52.4	78.1	51.3	78.1	61.9
0.5 Percent chlorine concentration								
#1—control	92.7	79.2	99.1	89.3	100.0	90.9	100.0	96.6
#1—melamine	90.6	88.3	94.0	93.3	97.4	93.9	100.0	98.2
#2—control	94.4	75.8	97.8	81.2	98.9	83.0	100.0	85.7
#2—melamine	93.7	77.8	97.9	81.5	95.8	84.1	96.9	87.8

* All values are negative except those marked (+).

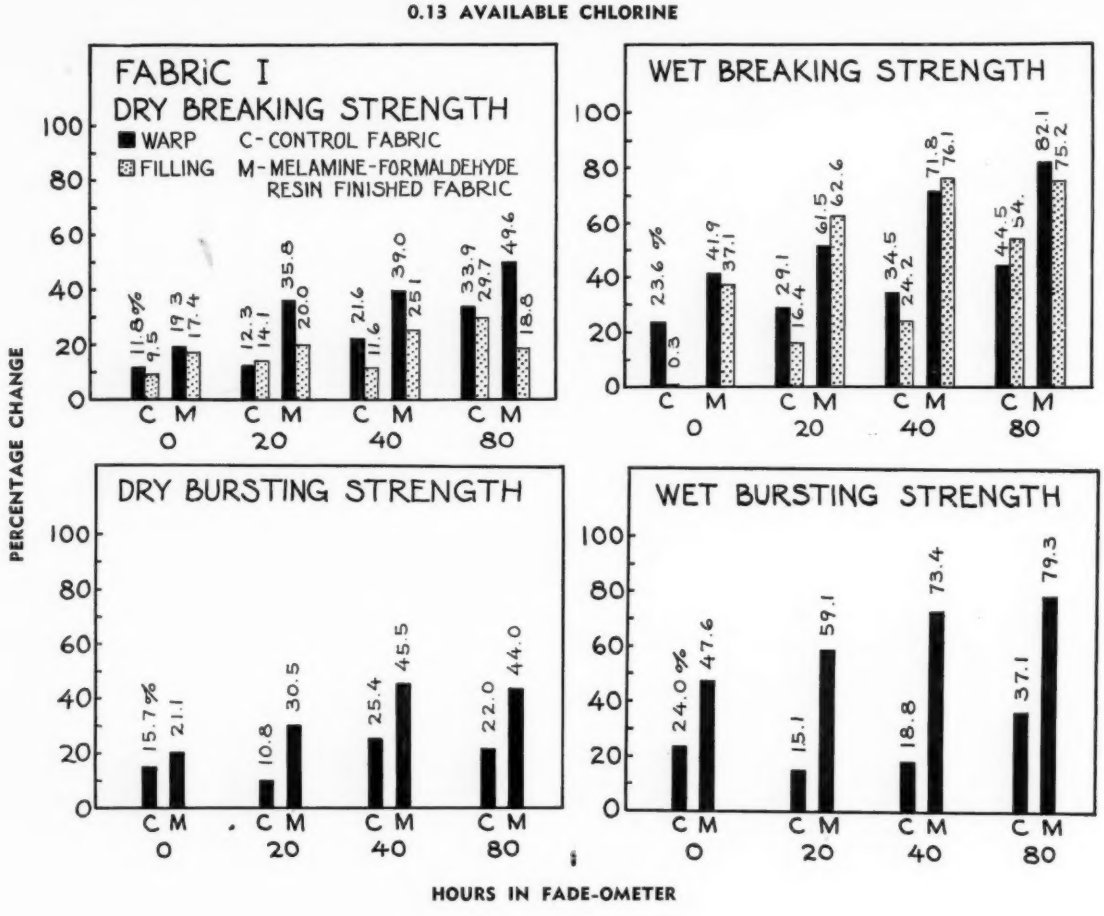

Figure 1
Dry and wet strength losses of melamine-formaldehyde resin-treated Fabric I and corresponding control, after laboratory treatment with a sodium hypochlorite solution with 0.13 percent available chlorine, and a series of light treatments in a Fade-Ometer

PLAN OF PROCEDURE

The two melamine-resin-finished fabrics and their paired control nonresin-finished fabrics, described in the study by Wham and Mack (*2*), were used in the present investigation.

The fabrics were treated with 0.015 percent chlorine, 0.13 percent chlorine, and 0.5 percent chlorine, respectively, according to the method previously reported. An equal portion of each fabric then was stored in darkness until the strength tests were made. All strength tests did not include pressing as it was shown previously not to exert a material effect on strength. The remaining fabrics were exposed in an F D A R Fade-Ometer for 20, 40, and 80 hours, respectively. Additional fabric was kept in the original condition as a basis for comparison.

Fabric damage then was evaluated in terms of breaking and bursting strength measurements. For these tests, the procedures as outlined in Commercial Standards CS 59-44 were used. The breaking strength determinations were made according to the ravel-strip method. Both wet and dry strength values were obtained. Strength changes were reported in percentages. The breaking strength changes were based on strength per thread.

In order to determine the extent of yellowing caused by pressing, fabrics treated with all three concentrations of chlorine

TABLE III

PERCENTAGE CHANGE IN DRY BURSTING STRENGTH OF EXPERIMENTAL FABRICS AFTER DIPPING IN CHLORINE SOLUTION AND EXPOSED OR NOT EXPOSED IN FADE-OMETER*

Fabric	*Unexposed*	*Exposed 20 hours*	*Exposed 40 hours*	*Exposed 80 hours*
	0.015 Percent chlorine concentration			
#1—control	2.0	1.7	6.5	0.8
#1—melamine	+2.4	5.9	9.8	9.9
#2—control	12.6	1.9	11.6	9.5
#2—melamine	15.2	18.9	5.4	3.2
	0.13 Percent chlorine concentration			
#1—control	15.7	10.8	25.4	22.0
#1—melamine	21.1	30.5	45.5	44.0
#2—control	20.7	6.5	8.8	9.5
#2—melamine	16.6	25.0	39.7	38.4
	0.5 Percent chlorine concentration			
#1—control	61.7	68.1	72.2	83.6
#1—melamine	78.3	82.2	86.3	89.4
#2—control	60.4	68.4	68.8	74.7
#2—melamine	76.5	81.0	79.6	84.2

* All values are negative except those marked (+).

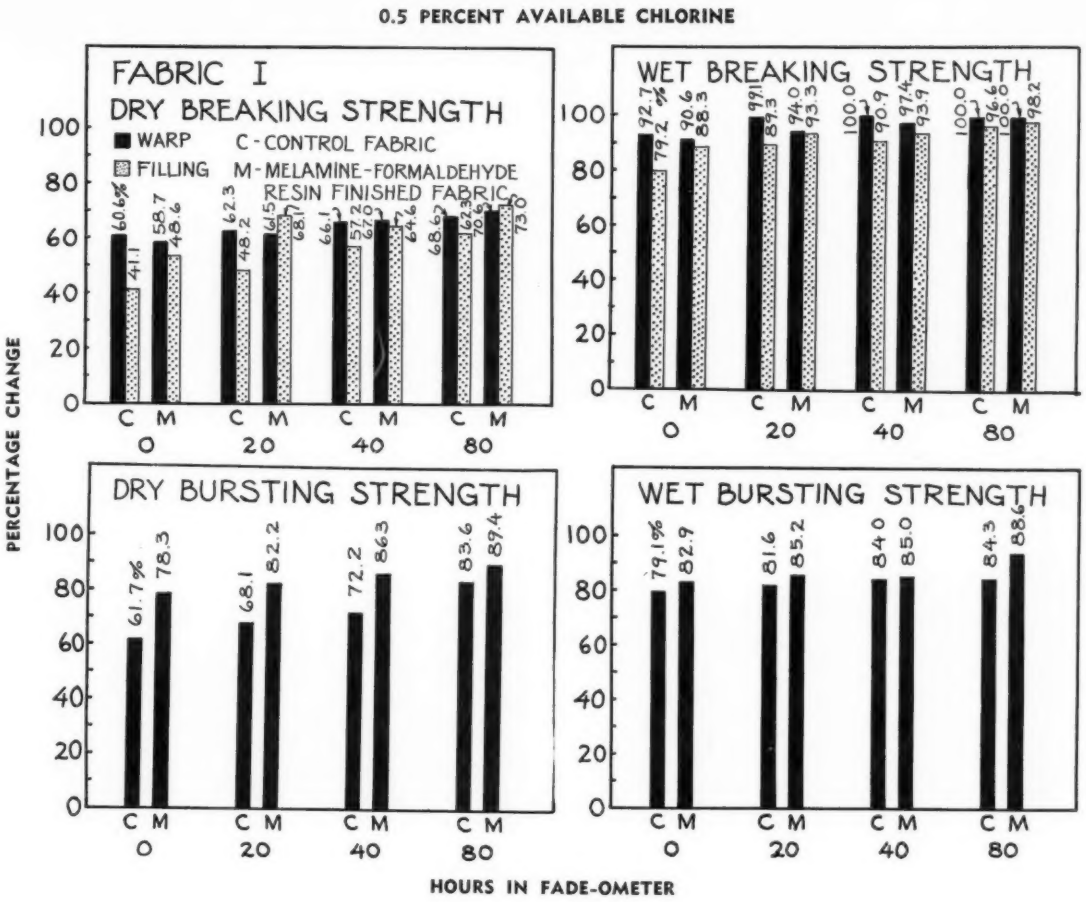

Figure 2
Dry and wet strength losses of melamine-formaldehyde resin-treated Fabric II and corresponding control, after laboratory treatment with a sodium hypochlorite solution with 0.50 percent available chlorine, and a series of light treatments in a Fade-Ometer

and exposed to the various degrees of light were pressed at 275° F with a hand iron for 20, 40, and 80 seconds. The yellowing was evaluated by visual judgment and classified as follows:

Class 1—no yellowing
Class 2—slight yellowing
Class 3—marked yellowing

TABLE IV

PERCENTAGE CHANGE IN WET BURSTING STRENGTH OF EXPERIMENTAL FABRICS AFTER DIPPING IN CHLORINE SOLUTION AND EXPOSED OR NOT EXPOSED IN FADE-OMETER*

Fabric	*Unexposed*	*Exposed 20 hours*	*Exposed 40 hours*	*Exposed 80 hours*
	0.015 Percent chlorine concentration			
#1—control	+3.7	+7.2	+2.3	25.0
#1—melamine	12.2	13.6	16.6	38.3
#2—control	7.0	+8.2	9.9	27.6
#2—melamine	19.4	14.5	24.0	19.7
	0.13 Percent chlorine concentration			
#1—control	24.0	15.1	18.8	37.1
#1—melamine	47.6	59.1	73.4	79.3
#2—control	5.0	8.8	27.0	34.3
#2—melamine	34.8	48.0	52.9	64.9
	0.5 Percent chlorine concentration			
#1—control	79.1	81.6	84.0	84.3
#1—melamine	82.9	85.2	85.0	88.6
#2—control	74.2	77.7	80.1	83.3
#2—melamine	76.0	78.1	74.5	75.7

* All values are negative except those marked (+)

DISCUSSION OF FINDINGS

Tables I-IV and Figures 1, 2, and 3 give the percentage change in strength after treatment with three concentrations of chlorine followed by various light exposure treatments.

No consistent trends were noted at the low concentration of 0.015 per cent chlorine in the strength loss of the melamine-finished fabric as compared with the untreated control.

At the medium chlorine concentration of 0.13 percent, the loss in strength of the melamine-finished fabric was consistently higher than that of the control fabric.

The trials in which the 0.5 percent chlorine concentration was used gave such high reduction in the strength of both of the resin- and nonresin-treated fabrics as to indicate that considerable degradation of the fiber had taken place in both cases during the chlorine treatment, thus eliminating the possibility of judging the

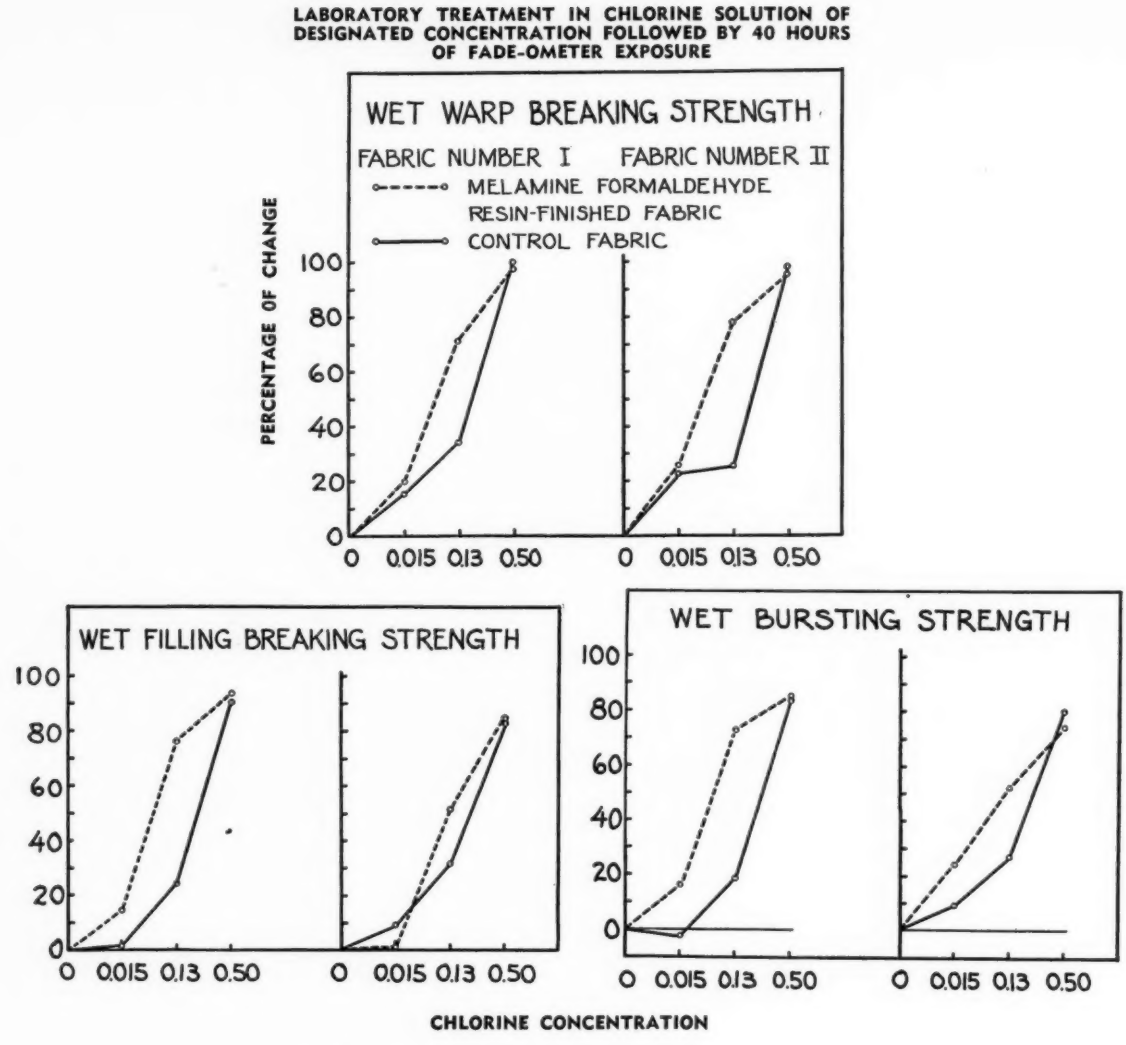

Figure 3
Wet strength losses after a series of treatments with three respective concentrations of chlorine solutions followed by 40 hours of exposure in a Fade-Ometer

TABLE V
CLASSIFICATION OF EXPERIMENTAL FABRICS ACCORDING TO EXTENT OF YELLOWING AFTER TREATMENT WITH VARIOUS CONCENTRATIONS OF CHLORINE FOLLOWED BY EXPOSURE IN THE FADE-OMETER AND PRESSING

Hours Exposure to Light	*0.015 Percent Chlorine Pressing Time in Seconds*				*0.13 Percent Chlorine Pressing Time in Seconds*				*0.5 Percent Chlorine Pressing Time in Seconds*			
	None	*20*	*40*	*80*	*None*	*20*	*40*	*80*	*None*	*20*	*40*	*80*
Fabric #1 (Melamine)												
Unexposed	1	1	1	2	1	1	1	2	1	2	2	2
20 hours	1	2	2	2	1	1	1	2	2	2	3	3
40 hours	1	1	1	2	2	2	2	2	2	2	2	3
80 hours	1	2	2	2	2	2	3	3	2	2	2	3
Fabric #1 (Dress)												
Unexposed	1	1	1	1	1	1	1	1	1	1	1	1
20 hours	1	1	1	1	1	1	1	1	1	1	1	1
40 hours	1	1	1	1	1	1	1	1	1	1	2	2
80 hours	1	1	1	1	1	1	1	1	1	1	2	2
Fabric #2 (Melamine)												
Unexposed	1	1	1	2	1	1	1	2	1	2	2	3
20 hours	1	1	1	1	1	1	1	2	1	2	2	3
40 hours	1	1	2	2	2	2	2	2	2	2	2	3
80 hours	1	1	1	2	2	2	2	2	2	2	2	3
Fabric #2 (Dress)												
Unexposed	1	1	1	1	1	1	1	1	1	1	1	1
20 hours	1	1	1	1	1	1	1	1	1	1	1	1
40 hours	1	1	1	1	1	1	1	1	1	1	1	1
80 hours	1	1	1	1	1	1	1	2	1	1	2	2

chlorine-retentive properties of the resin-treated fabric at this concentration.

The data on strength changes indicated a general trend toward an increase in loss of strength with increased light hours of exposure in the Fade-Ometer. This trend was noted at the higher concentrations of 0.13 and 0.5 percent chlorine, being particularly consistent at the latter concentration (see Figures 1 and 2).

Strength losses were generally higher in the melamine-finished fabrics at all levels of light exposure in the group treated with the intermediate concentration of chlorine (0.13 per cent available chlorine).

(Concluded on Page 441)

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American Association of Textile Chemists and Colorists

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Editor of Proceedings: Carl Z Draves, 30 Lahey St, New Hyde Park, N Y

July 6, 1953

Membership Applications

June 18, 1953

SENIOR

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John F Vega—Dyer, Swan Knitting Co, Cohoes, N Y. Sponsors: E A Chevrette, A Chevrette.

Anatole Wowk—Chemist, General Aniline & Film Corp, Central Res Lab, Easton, Pa. Sponsors: W W Williams, H B Freyermuth.

JUNIOR

Ernest F Carradori — Foreman, textile dyer, Luxor Finishers, Inc, Haledon, N J. Sponsors: B S Hillman, A I Wolpert.

Barbara Ann Gallo — Textile technician, American Cyanamid Co, Calco Chem Div, Bound Brook, N J. Sponsors: J J Black, R E Kourtz.

Nosal Named 1953 Student Award Winner

JOSEPH NOSAL (left) is presented with the 1953 AATCC Student Award, a copy of "Application of Vat Dyes". Making the presentation is H R Mauersberger, Director of the Textile Department, Fairleigh Dickinson College. Mr Nosal, vice-president of the FDC Student Chapter, is a graduate of Passaic, N. J. High School. His future plans call for further training as an apprentice in dyeing and finishing or laboratory research at Forstmann Woolen Company.

ASSOCIATE

George H Hamiter—Lab engineer, Erwin Mills, Inc, Cooleemee, N C.

Francis A Kraft—Sales rep, Becco Sales Corp, Buffalo, N Y.

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Royce A Peabody
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EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

53-14

Education: B S, Textile Chemistry and Dyeing.

Experience: Tricot and synthetics, dyeing and finishing.

Age: 33; married; position as superintendent of dyeing and finishing desired; Central or South America preferred. 7-6, 7-20

53-15

Education: High School, with extension courses in chemistry and business management.

Experience: Head Dyer, with experience particularly on synthetics.

Age: 42; married; references; position in South or Mid-West desired, as supt, head dyer or in technical sales. 7-6, 7-20

460 Attend '53 Philadelphia Section Outing

Approximately 460 members and guests were on hand for the 1953 Annual Outing of the Philadelphia Section on May 22nd at the Manufacturers Golf & Country Club, Oreland, Pa.

Although skies were overcast, the weatherman co-operated nicely with the golfing fraternity, which swelled to record numbers this year. Thomas C Jordan, W H & F Jordan Mfg Co took low gross honors with a 73, while W B Mohn, Textile Chemical Co, turned in 79, best among guests. Paul Peter, Columbia Silk Dyeing Co, won second prize with a 78 gross followed by Ed Smith, Nyanza Color & Chemical Co, 79, R Hamilton, Interchemical Corp, 79, R C Brown, Du Pont, 81. J H Mathewson, Carbide & Carbon Chemical Co and M Crystal, Thermco Products, were tied for second low gross among guests, each with 81.

Low net scores were divided into two classifications: Class A, under 100, and Class B, 100 or over. Scores of the first fifteen for each class follow:

CLASS A

	Gross	Net
J Snyderman	91	69½
D A Wolf	92	71
W E Brewer	96	71
R C Brown	81	71½
C A Seibert	91	72
M Galeone	86	72
A Schneider	86	72
R Jaeger	92	72½
T A Mahan	93	72½
W T Clarke	87	73
G Harkins	93	73
J W Farquhar	96	73
S Himmelreich	86	73
J Waetz	86	73
J Jordan	85	73

CLASS B

	Gross	Net
P Sulitan	106	70
R C Cummings	101	70
J A Adams	101	72½
D Kopp	113	72½
K Schmallenberger	111	73
J Murphy	131	73
W Fye	106	73
W W Gleadall	136	73
A Morrell	111	73½
G B McCulloch	113	73½
C A Tier	123	74
J Cannon	123	74
J R Sharp	111	74
R C Carr	112	74
C E Cain	112	74

A H Milask, Atlantic Refining Co, won the "nearest to the pin" contest on the eighth hole, with a shot which landed 15 inches from the cup. L W Meyer, American Aniline Products, Inc was second with a shot landing 3 feet from the cup.

The dart throwing contest was won by James Lord, Waverly Dyeing and Finishing Co, with a score of 50. Joseph Murphy, Laurel Soap Manufacturing Co was second, and Emil Peters, Onyx Oil & Chemical Co, third.

The quoits tournament was won by the team of Robert Graupner, American Aniline Products, Inc and Roy Smith, Florence Thread Co. Paul Pernice, General Dyestuff Corporation and William Clarke, Arnold Hoffman Co placed second.

Partners Al Koch, Sandoz Chemical Works, and Harold DeTurck, Berkshire Knitting Mills placed first in the pinochle contest, and placing second was the team of Warren Fisher, William G Leininger Knitting Co, and Charles Schuettler, Scholler Brothers.

Dinner was served from 5-8 and upon its completion prizes were awarded. An outdoor, three-act floor show concluded the day's activities.

The outing was under the chairmanship of A E Raimo, John Campbell Company.

(L to r):
General Dy
Products Co

Seated (l
J Koch, Jr.
& Co, Inc; F
Salt Co
Standing
Hogan; A F
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At the s
W Wolf, W
& Fite Co; I
American A
Spectator
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ist; Chia-Lo
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ANNUAL OUTING
PHILADELPHIA SECTION
MAY 22, 1953
MANUFACTURERS GOLF & COUNTRY CLUB
ORELAND, PA.

The Receptionists

(L to r): D A Siravo, Hess, Goldsmith & Co; E Empting, General Dyestuff Corp; T R Scanlan and T H Hart, Hart Products Corp

Seated (l to r): G D Mansfield and B Casey, Pioneer Salt Co; J Koch, Jr, Darby Dyeing Co; R Sharp, E I du Pont de Nemours & Co, Inc; R Senior, Continental Mills, Inc; M A Grace, Pioneer Salt Co

Standing (l to r): D Robinson, Alco Oil & Chem Corp; Ben Hogan; A Felgendreger, Continental Mills, Inc; S Brown, Monsanto Chem Co

"Quoit" a group

At the stake (l to r): W Griesinge, Atlantic Refining Co; W Wolf, William G Leininger Knitting Co; B Lisowski, Krout & Fite Co; H Neumann, L Sonneborn Sons, Inc, and G Moffitt, American Aniline Products, Inc

Spectators include (l to r): R Graupner, American Aniline Products, Inc; J Smith, Florence Thread Co; B Brisbane, journalist; Chia-Lo-Liu, Krout & Fite Mfg Co; P Krasley and L Krasley, Krasley Bleach and Dye Works

(L to r): J A Woodruff, American Viscose Corp; F V Traut, Globe Dye Works Co; Bertram Hayward, Philadelphia Textile Institute; W Bertolet, III, Laurel Soap Co, Inc; J Hoffner, Hoffner Rayon Co; W Fuller, Arnold Hoffman Co; and E Smith, Nyanza Color & Chem Co

(L to r): M Schiff, Thermco Products, Inc; I Krundel, Allan Dyeing Co; H Steen, Geigy Co, Inc; L Schiff and P Schiff, Thermco Products, Inc

Seated (l to r): R Wilson, Jr, National Aniline Div; A S Kohout, R W Fidler, J W Fidler and R Kroener, Kohout and Fidler Co

Standing (l to r): K McChesney, Leatex Chemical Co; R Jaegers, Standard Chemical Products, Inc; W Tomulka, Florence Thread Co; J Lord, Waverly Dyeing and Processing Co; J McChesney, Leatex Chemical Co

Seated (l to r): W Guffy, Forrest Piece Dye Works; C Holweger, Royce Chemical Co; E Burrell, Roxborough Co; T Atkinson, Scholler Bros, Inc; R Carr, Sheila Carlton Mills; W Kamarek, Richmond Oil, Soap and Chem Co; R Gorton, Columbia Silk Dyeing Co; L Meyer, American Aniline Products, Inc; and R Kerwin, Diamond Alkali Co

Standing (l to r): F Dannerth, Consultant; F Hutt, Phila Quartermaster Depot; and R Schadewald, Kali Manufacturing Co

THE AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS
LOWELL, MASSACHUSETTS

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NOTES

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Hudson-Mohawk Section——

OXIDIZING WITH TEXTONE*

GORDON O SMITH
Mathieson Chemical Corporation

INTRODUCTION

WHEN I speak of oxidizing with Textone, sodium chlorite, the idea is to include a number of operations, in other words, operations where Textone definitely acts as an oxidizing agent. Such will include bleaching of both synthetics and cottons; stripping of dyes from synthetics; oxidizing dyes from the reduced leuco state on synthetics and cottons in jigs and on continuous ranges.

Some of you are already familiar with many of the processes just mentioned, but I do have a couple of new ideas to pass on to you this evening concerning the use of Textone in the textile industry. Textone has been on the market for a number of years, and, during that time, it has been the aim of Mathieson to try to develop processes that produce better results. Part of this work has come from the laboratory, and part has come from the men in the field working without the ready convenience of laboratory facilities. We cannot neglect men of individual companies within the textile industry who have worked out their own operations using Textone. The details of some of these operations are generally known, but there are quite likely some of which the details are still within the plant where they originated.

G O Smith

Textone sodium chlorite is finding increasing use in textile processing for carrying out various oxidative reactions, including bleaching, the oxidation of vat dyeings after application, and the stripping of dyeings, especially on nylon. Oxidation with Textone may be conducted in a solution either alkaline with bicarbonate or acid with formic or acetic acid. Oxidative processes with Textone may be carried out either batch-wise or continuously.

BLEACHING SYNTHETICS

BATCH PROCESSES———Textone has long been known as a superior bleaching agent for synthetic fibers, including nylon, Vicara, dynel, Dacron and Orlon. Maximum whiteness can be obtained with minimum degradation of the fiber. Bleaching is usually carried out in dye becks of stainless-steel construction, and a typical bleach formula might be as follows:

Liquor-to-cloth ratio, 17:1
2.5 gpl Textone
1.0 gpl synthetic detergent
pH, 3.4-3.5
Temperature, 180 to 200° F
Time, 1 to 1½ hours.

After the desired bleach is obtained, the bath is dropped and the goods are given a warm rinse for 10 to 15 minutes; no antichlor is necessary. The activity of the bleach bath varies directly with an increase in the concentration of the bleaching agent and with an increase in temperature, and inversely with pH. It is therefore possible to vary the above factors to obtain a bleaching time suitable for particular requirements.

In the use of the process just outlined, there will be an evolution of chlorine dioxide (a gas released from Textone under certain conditions). Therefore, equipment used for bleaching should be hooded and it should be vented to the outside atmosphere.

BLEACHING SYNTHETICS CONTINUOUSLY———Preliminary work has been done which strongly indicates that woven synthetics can be bleached continuously in a matter of a few minutes in a system using Textone at a pH of 3.2-3.5 in a steam atmosphere (temp about 190°F). The major obstacle to such a system is equipment. In this age of plastics, it should be possible to construct equipment from plastics or a combination of plastic and fiberglass.

Work done in a laboratory setup indicates that excellent whites on rayons can be obtained in a matter of 2 to 4 minutes. The amount of Textone required was less than the amount required for batch bleaching in becks. As no one to my knowledge is making use of this process at the present time, actual plant results are not known. The procedure has been mentioned to one concern, but, for a number of reasons, it has not been pushed by Mathieson up to now. I mention it here for the benefit of those who might be interested, might have some pioneering spirit, and perhaps might want to play around with such an idea.

In connection with bleaching synthetic fibers, I do know of one large rayon producer who is bleaching rayons with Textone activated with hypochlorite at pH values on the alkaline side with entirely satisfactory results. Since most people prefer to bleach rayons on the acid side, this is an isolated case, so far as I know. One outstanding feature of the process is that it can be carried out in equipment made of conventional materials of construction, and there is no problem of gas coming from the bleach bath.

The most successful bleaching of cottons with Textone is done with the procedure just mentioned, that is, Textone activated with hypochlorite on the alkaline side. The equipment used in this case is the same equipment that is used in bleaching with hypochlorite alone. Goods are prepared in much the same way as for hypochlorite bleaching: namely, desize and singe; sour; kier-boil; sour; saturate with bleach; stack in bleach bins; antichlor; stack in white bins.

The major difference between bleaching with Textone activated by hypochlorite and bleaching with hypochlorite alone is in the bleach solution itself. The bleach solution is buffered to a pH of 9.1 - 9.5 with a mixture of soda ash and bicarbonate. The ratio of hypochlorite to Textone (on an available-chlorine basis) ranges from 1.5:1 to 3:1. The actual pH adjustment is made according to the desired speed of bleaching; the lower the pH, the faster the bleaching (pH should not be allowed to go below 8.9 because of the evolution of chlorine dioxide at pH values lower than that). The ratio of hypochlorite to Textone will depend on the extent of preparation the goods have received. The better the preparation, the smaller the ratio should be. In other words, on goods that are well prepared, the ratio would be set

* Presented at Jack's Restaurant, Albany, N Y, on Friday, March 20, 1953.

† Registered trade-mark

at 1.5:1, whereas, on goods that have not received such a good preparation, the ratio would be set at about 2.5:1.

Textone activated with hypochlorite produces excellet whites with a minimum of strength loss. Moreover, the white obtained is lasting. I have a number of samples with me that were bleached in 1948 with the above process, and as you will see on inspection, they have not yellowed with age. The cost of bleaching with Textone by this process will be about 20% above the cost of straight hypochlorite bleaching. Of the plants presently bleaching with hypochlorite activation of Textone, all put out top-quality work.

The question that may logically come to mind at this time would concern the activity toward development of a continuous Textone bleaching process for cottons. All that can be said along that line is that preliminary work has been done and the results were good enough to warrant further consideration.

OXIDATION OF VAT DYEINGS

ON ALKALINE SIDE———Textone as an oxidizing agent is also used in oxidizing vat dyes both in jigs and on continuous ranges. Although the chemicals used are the same for both types of equipment, for the sake of clarity, I'd like to discuss them separately, taking jig work first. Again a division is necessary because Textone may be employed on the alkaline side in the presence of bicarbonate, or it may be used on the acid side if peroxide is also used to repress chlorine dioxide. So I will first deal the use of Textone in jigs in the presence of bicarbonate.

The usual procedure in oxidizing vat dyeings on jigs is to wash with cold water for two ends, oxidize, soap, wash, and then shell up through cold water. If chrome and acid are used for oxidation, there is constant bedevilment from chrome salts, since they cannot be entirely washed out with ordinary washing. In using Textone and bicarbonate there is no residual that is difficult to wash out. A typical procedure for Textone would be as follows: two cold ends after reduction; four ends in the oxidizing bath, at which time you also soap; two ends hot wash; shell up cold. One pound of Textone is usually sufficient for the average 500-lb roll. The amount of bicarbonate necessary will depend on how much caustic is used in the reduction; usually one pound of bicarbonate for each pound of caustic soda used in the reduction will be sufficient. To be more specific, I will go more fully into the four ends for oxidation, the chemicals for one roll on a jig being as follows:

1 lb Textone
1 lb bicarbonate for each lb of caustic soda used in reduction
1 lb of synthetic detergent
pH, not over 9.8
Temperature, 140° F.

Add one half the Textone and bicarbonate and all the detergent on the first end. Add the remainder of the Textone and bicarbonate on the second end. Run two more ends, drop bath, give two hot washes and shell up cold.

Oxidizing with Textone cuts time and chemical costs as compared with other methods. The shades obtained are brighter and cleaner than from oxidation with chrome and acetic acid. Wash and light fastness are as good as with other methods.

ACID OXIDATION OF VAT DYEINGS———The use of Textone on the acid side for jig oxidation is a rather new venture. The one company that I know of who is using Textone in this way has been doing so for only a short time. The results up to now are remarkably good. This company was previously using chrome and acid. By using Textone on the acid side, they cut the time a roll is on their jigs by one hour. Moreover, they have cut chemical costs and soaping costs by $0.43 per roll. Of course this $0.43 savings is minor to the savings in time, water and steam. The plant in question processes mostly drapery material and corduroys on their jigs. The procedure they use is as follows:

Two ends cold wash after reduction.
Drop wash water.
Oxidize and soap
  Add to first end
  1 lb Textone
  ¾ lb 130-vol peroxide
  1 lb TSPP
  1 lb Igepon T Gel
  3 lb 85% acetic acid, added last
  Run at 140° F.
  Add additional 3 lb acetic acid on second end and run at 140° F.
  Run one more end at 140° F.
Drop bath.
Shell up through water at 200° F.

With the amount of caustic soda they use in their reduction, there is sufficient caustic left in the cloth to keep the pH in the oxidizing bath above 5.5 and, as a general rule, the pH of the cloth as it is shelled up is within a few tenths of a point of a pH of 7. There was about 0.9 gpl available chlorine as both chlorite and peroxide in the water coming off the cloth as it was shelled up. However, after the cloth was finished and dried, tests with acid, potassium iodide and starch indicator showed that there was no trace of available chlorine in the cloth.

No determination of the above 0.9 gpl was made to see how much of it was chlorite and how much was peroxide. At any rate, whatever it was, it was destroyed by the finishing and drying.

I have already mentioned some of the advantages of the above process over chrome and acid. In addition to savings in time, chemical costs, water, steam and soap, this plant was able to cut down the amount of cloth they had to rework because of shading (due to deposits of chrome salts) to almost nothing; to be more specific by quoting yardages, they had 300 yards out of 400,000 returned because of shading, and it is doubtful if this shading was caused by the oxidation. Before, when chrome and acid were used, reworks because of shading were a headache.

With such an over-all saving, you might wonder if there is a drawback somewhere else along the line, perhaps on light and wash fastness, or in matching shades. Extensive tests have been run to determine the comparison of wash and light fastness with that obtained with their previous method of oxidation. The results showed fastness to be as good and in some instances better. Better wash fastness could be expected since there are no deposited salts to be washed out as there is in using chrome. In matching shades, the depth of color was obtained, but the shade was brighter and cleaner. In a couple of instances, as much as 10% more color value was noticed. Depending on how closely standards must be matched, that is, if a brighter shade is objectionable, slight adjustment in dye formulas may be necessary. I have several samples of the different shades oxidized with acid Textone for those of you who care to inspect them. The samples I have do not cover the entire range of colors that have been worked with; in no instance was trouble encountered oxidizing any of the colors worked on.

CONTINUOUS OXIDATION OF VATS, ALKALINE SIDE———Oxidation on continuous ranges, whether for the pad-steam process or with Williams Units, is essentially the same. A wash before the oxidation is of course necessary. After the wash, we oxidize, soap and wash. The extent of each procedure depends on how much equipment is available. A plant dyeing various pastel shades on sheets has cut the oxidation time by use of Textone about as short as I have ever seen it done. They come from their booster to one wash box, one box for oxidation, the following box holds soap and carry-over from the oxidation box and one final box for washing. The only other wash the goods receive is the slight amount accomplished as the sheets go through a shallow box preceding the mangle. They have been running on this for about 3 years and, as far as I know, have not run into any trouble from insufficient washing.

As with jig oxidation, Textone may be used in continuous ranges both on the alkaline side and on the acid side. When used on the alkaline side, it is used in conjunction with bicarbonate. If we take sheeting as a basis, it would require about one pound

Concluded on Page P434)

Piedmont Section——

PROBLEMS IN DYEING SYNTHETIC-FIBER BLENDS*

EDWARD SZLOSBERG
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INTRODUCTION

THE subject under discussion today—the problems encountered in dyeing the newer synthetic-fiber blends—is so wide and diversified that it would not be possible to deal in detail with all of its aspects in the course of a single paper. Of necessity, therefore, one has to limit the scope to the important and more common problems met with in our attempts to deal with the ever-increasing variety of synthetic blends.

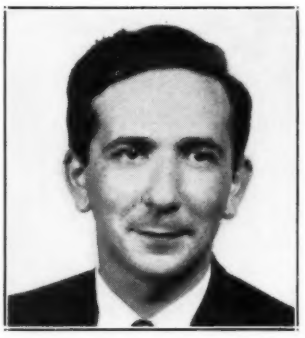
MANUFACTURE OF SYNTHETIC FIBERS——Let us first of all deal briefly with the individual synthetic fibers. The true synthetic fibers which have reached the production stage in the last ten years can be divided into three distinct chemical groups.

The first group embodies the synthetic protein fibers and includes such fibers as Ardil (produced in Great Britain from peanuts) and Vicara (produced by Virginia and Carolina Chemical Company).

The second group, generally referred to as the acrylonitrile group, includes, among others, Acrilan (produced by Chemstrand Corporation), Orlon 41, 42 and 81 (produced by DuPont) and dynel (produced by Carbide and Carbon Chemicals Company). Also contained in this group are three or four other fibers, which are yet to reach commercial production. It should also be mentioned that Orlon 42, an improved type of the spun fiber, is only now reaching the commercial market. This chemical class of new fibers is distinguished by the fact that all of its members contain an acrylonitrile polymer in the molecule and that they can be prepared by a simple polymerization.

The third group of fiber-forming polymers is generally referred to as polycondensation products. This group includes such fibers as nylon (a polycondensation product of hexamethylene-diamine and adipic acid) and Dacron (made by condensation and polymerization of ethylene glycol and terephthalic acid). Both these fibers are produced in this country by the DuPont Company.

While the acrylic fibers, such as Orlon and dynel are wetspun from a solution in a suitable solvent, the polycondensation fibers, such as nylon and Dacron, are melt-spun under pressure and immediately stretched. For the purpose of this discussion, we propose to omit the protein-fiber blends and to deal only with the two chemical groups just mentioned.



E Szlosberg

After a brief explanation of the different types of wholly synthetic and regenerated fibers, the author explains the two more important methods of dyeing the wholly synthetic fibers at or near the boil: namely, by the use of carriers, or swelling agents, such as various cyclic derivatives, and by the use of cuprous ions from the reduction of cupric sulfate with hydroxylammonium sulfate. Acrilan and nylon fortunately have better affinity and can be more easily dyed by conventional methods.

Most of the paper deals with the use of the dyeing methods first described or modifications and combinations of them in one-bath or two-bath procedures to dye various fiber blends, including the following: viscose rayon with Dacron, dynel, Orlon, Acrilan, and nylon; wool with Dacron, Orlon, nylon and Acrilan; acetate with dynel and Orlon; and combinations containing no "old" fibers, such as Dacron-Orlon, Dacron-nylon, Orlon, nylon, and Vicara-nylon. The attainment of two-tone effects is also mentioned.

DYEING METHODS

DYEING ACRYLIC——The methods utilized by the industry for dyeing these fibers can be divided into two distinct categories. The methods of the first category, mainly applicable to the acrylic fibers, depend upon the introduction into the dyebath of a metallic salt in its lower valency, which assists in the exhaustion of water-soluble dyestuffs. After many trials such a salt was found in copper sulfate, reduced to its lower valency by a suitable reducing agent, such as hydroxylammonium sulfate. This combination has proven during the last three years a most valuable and effective solution for the problem of dyeing synthetic fibers of the acrylonitrile type. It therefore follows that, while dynel and Orlon respond to this method, fibers such as Dacron do not.

POLYESTER DYEING METHOD——This brings us to the second principle employed as a solution to the dyeing problems, namely, the introduction of a swelling agent. It has been known for some time that certain aromatic compounds, when introduced into a dyebath, effectively swell a hydrophobic fiber and promote the absorption of an insoluble dyestuff by the fiber. While it is true that some of the acrylonitrile fibers will be helped by the swelling agents, their main application is found in dyeing Dacron.

Among the better known swelling agents effective for the dyeing of Dacron are monochlorobenzene and more highly chlorinated benzenes, benzoic and salicylic acid, ortho- and paraphenyl phenol, as well as a number of other chemicals of a similar structure.

You will notice that no mention has been made of nylon or Acrilan in connection with these two dyeing principles, since both of these fibers lend themselves more easily to the conventional dyeing techniques and do not require any of the procedures mentioned for the exhaustion of dyestuffs. Having discussed briefly the dyeing properties of the newer synthetic fibers, we might now proceed to the main subject of synthetic blends.

PROPERTIES OF FIBER BLENDS——Why is it that we mix natural fibers with the newer synthetics and disturb the already difficult life of the dyer? The fact is that the newer synthetic fibers bring with them properties which their older counterparts do not possess. The controlled production of staple makes them uniform and therefore most adaptable to subsequent processing. The crease-resistance of a blend increases its quality; tensile strength adds to wearing properties; low specific gravity makes the fibers bulky in nature. These are only a few of the advantages derived from blending the newer fibers with the old.

* Presented at the Robt E Lee Hotel in Winston-Salem, N C, on Saturday, April 11, 1953.

And now, when the spinner and the weaver have solved their problems and finished their job, it is the dyer and chemist who are left with the responsibility of coloring the fabric in such a way that it maintains its quality.

BLENDS WITH VISCOSE RAYON———Let us deal with some of the more common blends processed at the present time. The most frequent fiber used as a component for a synthetic blend is viscose rayon. The blends of viscose with the newer synthetic fibers have proved successful for a variety of fabrics used mainly for ladies' wear. The dyeing of these blends falls into two distinct categories. When the synthetic fiber can be dyed with acetate colors with a required degree of fastness, it is, of course, possible to dye the blend by the one-bath method, essentially similar to the one employed for acetate-viscose blends. Such is the case when dyeing Dacron- or dynel-viscose blends. The former must be dyed with a suitable swelling agent, such as Velanol NB or TC and selected acetate colors, while the viscose component is filled in with a normal range of direct colors with or without aftertreatment. It is well worth mentioning that, when a solid swelling agent, such as orthophenylphenol or benzoic acid, is decided upon for Dacron, it becomes necessary to use a two-bath method whereby Dacron is dyed first at the boil and viscose is cross-dyed at lower temperatures. When dynel-viscose blends are dyed, a very similar principle is employed, except that it is not absolutely essential to use a swelling agent, since dynel exhibits a direct affinity for acetate colors.

Matters were complicated considerably when viscose was blended with either Orlon 41 or Acrilan, the former having little affinity for acetate colors at conventional temperatures, the latter producing full shades but with unsatisfactory wet fastness and poor stability to light. It was therefore necessary to reach for the second principle in solving this problem, namely, the introduction of cuprous salt. And, indeed, Orlon 41-viscose blends are currently dyed by the two-bath method, whereby the Orlon component is dyed with selected acid colors at the boil in the presence of cupric sulfate and the reducing agent hydroxylammonium sulfate, the stain on the viscose is soaped off, and the latter is cross-dyed with selected direct colors at temperatures not exceeding 180°F in the presence of anhydrous sodium sulfate rather than common salt as an accelerating agent. Common salt must be avoided in crossdyeing since acid colors on Orlon exhibit a tendency of being stripped by the chloride ion. It does not seem practical to dye this blend by the one-bath method as the drop in the pH value accompanying the addition of the reduced copper would cause the direct colors to be precipitated and retarded.

More recently blends of Acrilan-viscose have become quite popular, and, in fact, large quantities of this blend are dyed throughout the country. From the previous remarks it must be clear that in dyeing this mixture the cuprous-ion principle is unnecessary since Acrilan lends itself easily to the conventional methods, the only requirement being the introduction of a strong mineral acid, such as sulfuric acid, into the dyebath. The instant one mentions the name of sulfuric acid in connection with dyeing viscose, the dyer shakes his head and the chemist raises his eyebrows. Theoretically, of course, both of these gentlemen are correct. It is true that quantities of sulfuric acid in contact with regenerated cellulose such as viscose degrade cellulose to hydrocellulose and disintegrate the fiber. But in practice, the dark deeds of sulfuric acid somehow do not occur. Experience has been that it is quite safe to introduce such quantities as 2% of acid at temperatures up to 200° F with little damage to viscose, provided a thorough soaping is given at the completion of the dyeing process. It is therefore an established method to dye Acrilan-viscose blends by first coloring the Acrilan component with selected acid, chrome, or premetallized colors and then to cross-dye the viscose with direct colors at temperatures not exceeding 180°F in the presence of sodium sulfate for exhaustion. Again here, as in the case of Orlon, it is not practical to use a one-bath method because of the low pH value. We are aware of the fact that this is an uneconomical method and that the one-bath method would be preferable. This can already be accomplished in the case of light shades when the amount of sulfuric acid necessary for the exhaustion of colors on Acrilan is small and therefore the resultant pH value is withstood by selected direct colors. In this case, the method follows: Both acid colors and direct colors are added to the bath at the start of the dyeing operation, followed by sodium sulfate. No acid is added at this point. The temperature is raised slowly to 200°F, and direct colors are exhausted on the viscose component. When a satisfactory shade is produced on viscose, sulfuric acid is added, the temperature is raised from 200°F to a boil and dyeing is continued for one hour. This addition of acid exhausts the acid colors on Acrilan. Again it must be stressed that this method is not applicable to medium or full shades. There are, however, some hopeful signs that it might in the near future be possible to dye even dark shades by the one-bath method.

ACRILAN CN 33———Since the beginning of this year, the Chemstrand Corporation is producing a newer, improved type of Acrilan under a provisional code name, CN 33. This type of Acrilan is more dyeable than its predecessor. Full shades, including navy and black, can be obtained on CN 33 with amounts of dyestuff only slightly higher than those used for natural fibers and with quantities of sulfuric acid equal to those of dyestuff. An example perhaps will illustrate the matter. A good black can be obtained on Acrilan CN 33 by dyeing it with 6 to 8 percent of Vitrolan Black WA type with 4 to 6 percent of sulfuric acid in the dyebath. When these figures are compared with the recommendations for wool, it will be found that they are almost identical. Since it was found that this fiber can also be dyed with selected direct colors, we are at present working with a view of finding a number of direct colors which will give approximately equal exhaustion on both Acrilan and viscose. These could be applied in a one-bath method. Here again, the question of the use of sulfuric acid will come up, since even direct colors must be applied to Acrilan at a low pH. Even if the possible deterioration of the viscose component is disregarded, one might well ask what will happen to the direct colors in the presence of sulfuric acid. We have tentatively solved this difficulty in the following manner: We pretreat our blend with 2 percent sulfuric acid at temperatures ranging from 200°F to a boil for a time not exceeding 15 minutes. The excess of acid is then rinsed out but this rinsing does not bring the pH value to its neutral point and enough acidity remains to exhaust direct colors on Acrilan. When the direct colors are then introduced into the dyebath, they maintain their solution and are drawn equally by both components.

NYLON-VISCOSE BLENDS———Nylon-viscose blends are also found in some volume, particularly in hosiery and dress goods. Two distinct methods might be employed for dyeing these blends. A one-bath method can be used, nylon being dyed with acetate colors, and viscose with selected direct colors. Some staining of nylon by direct colors will invariably occur, but this can be prevented by small additions of alkali. When the fastness requirements are high, however, a two-bath method is resorted to where viscose is dyed with vat colors and nylon with acid colors. The remarks relating to the viscose-synthetic fiber blends will, of course, apply with small modifications, when viscose is substituted by cotton.

WOOL BLENDS———The second most common natural fiber used in blends with the newer synthetics is wool. Let us consider some of the more common blends containing this fiber.

WOOL-DACRON———When a blend of wool and Dacron is to be dyed in such a way that Dacron is to be left white, no difficulty is encountered, since a large majority of acid, chrome or premetallized colors have no affinity for Dacron.

In order to dye Dacron and to leave wool white, it becomes necessary to select acetate colors that stain wool least and to soap off the dyed material in order to remove any staining left on the wool component.

In dyeing solid shades, a one-bath method can be adopted. In this case Dacron is dyed with selected acetate colors in the presence of a swelling agent, such as Velanol NB or TC, and wool is filled in with neutral-dyeing acid colors, chrome colors, or the new types of premetallized colors, such as the Lanacyns of Sandoz or the Irgalans of Geigy. The pH value of the bath should be maintained between 5 and 6 with either ammonium sulfate or acetic acid during the first 30 minutes of dyeing to prevent the tarring of acetate dyestuffs and the staining of wool. If chrome colors are used for wool, the dyebath is acidified after 30 minutes of boiling and bichromate is added in the usual manner.

This method, although used on a commercial scale, is not completely satisfactory, inasmuch as even the selected acetate colors will stain wool to some degree, and this stain in turn will deteriorate the fastness properties of the wool component. The most urgent need is for a resisting agent, which, when introduced into the bath, would prevent acetate colors from staining the wool component in a manner similar to that in which many of the already-existing compounds successfully resist acid colors on nylon and to a lesser degree on wool.

WOOL-ORLON———Let us now consider an important blend which is gaining in popularity at the present time, namely, the Orlon 41-wool blend. In dyeing unions on this blend, it is necessary to depart from the cuprous-ion technique and the use of acid colors for the Orlon component. This is primarily due to the fact that wool will invariably absorb more of the acid colors, even when large amounts of reduced copper are employed.

It has been known for some time that basic colors have a direct affinity for Orlon fiber and can be applied to it without the use of any such assistants as are necessary for the application of acid colors. Basic colors, however, when applied to Orlon 41 in the presence of wool will stain the latter rather heavily—in some cases the shade on the wool being equal or deeper than on Orlon. When basic colors, however, are applied with acetic acid as well as with a nonionic dispersing agent, such as Ekaline F, the staining of wool becomes very slight and can be soaped off after dyeing. The wet-fastness properties of basic colors on Orlon 41 are good to excellent, while the light fastness varies with individual members. It is possible upon careful selection, however, to find several basic colors with a light fastness of between 20 to 40 hours in a Fade-Ometer and considerably better fastness in sunlight. It becomes apparent, therefore, that selected basic colors when dyed on Orlon will satisfy many fastness requirements. The method of dyeing this blend will depend upon the type of dyestuff chosen for the wool component. If the dyes used are of a neutral-dyeing type, such as the Xylene milling series or the Lanasyn colors it is necessary to use a two-bath method, since a large quantity of acetic acid must be added along with basic colors. If, however, level acid or chrome colors are decided upon for the wool component, a one-bath method could be used, A word of caution must be added on the use of the one-bath method. Some of the basic colors, when mixed with the oppositely charged acid colors, might precipitate in the dyebath, and in such cases a two-bath method becomes necessary. The general procedure, therefore, depends upon treating the blend with 10 percent of acetic or hydroxyacetic acid and 5% of Ekaline F. These chemicals are added to a cold dyebath and are followed by selected basic colors, the temperature is slowly raised to the boil and boiling is continued for one and one-half hours. When a satisfactory shade is obtained on Orlon, the material is rinsed, soaped off, and the wool is cross-dyed by conventional methods. As some bleeding of Orlon will occur in the second bath, the temperature should be kept as low as is practicable. One would not like to leave the impression that the method as described here is universally accepted or without difficulty. To our knowledge, the bulk of wool-Orlon blends are dyed separately in raw stock or top form, Orlon being dyed under pressure, and the components being blended together in the subsequent operations. The basic-color method is given, however, as an indication of a promising possibility and is mainly applicable to piece dyeing.

WOOL-NYLON———A very common blend available is that of nylon-wool. Generally speaking, more experience has been had with this blend than with any other mentioned in this paper. It is therefore generally known that, while nylon will absorb in light shades a larger share of acid color than wool, the solidity improves as the depth increases. At medium depth usually both nylon and wool dye to the same degree and therefore give a solid shade, while in concentrated dyebaths nylon on reaching its saturation point will dye no longer, while wool will absorb its share of dyestuff and therefore will dye darker. The latter tendency is not so important because in deep shades the difference between the nylon and wool is not easily perceptible and a solid effect is apparent. In light shades, however, the slightest difference in depth is visible. In such cases, it becomes necessary to choose the dyestuffs skillfully, namely, those with more sulfonic acid groups and therefore less affinity for nylon, and also to introduce into the bath resisting agents for nylon, such as Resolin B paste, which, having preferential affinity for nylon, will be absorbed by it and thus reduce its affinity for the dyestuff.

WOOL-ACRILAN———Among other blends of wool and synthetics, an Acrilan-wool blend is found. The production of solid shades on this blend was difficult when the Acrilan component was of the 1952-production type. The improved type of CN 33 with greater affinity for dyestuffs is much more adaptable for this blend. It is now possible to produce solid shades by a one-bath method with selected level-dyeing acid colors in the presence of sulfuric acid at the boil. The premetallized colors of the Vitrolan series and the neutral-dyeing acid colors are, in most cases, unsuitable for this purpose. It is usually advantageous to pretreat this blend in 2 percent sulfuric acid at 200°F for 15 minutes and to rinse well. After this pretreatment the dyebath is made up cold with selected colors and part of the required sulfuric acid, the temperature is raised to the boil, and boiling is continued for one and one-half hours while the remainder of the acid is added gradually.

ACETATE BLENDS———The blends of acetate with newer synthetic fibers have not yet reached the degree of importance of the other blends. However, an interesting dyeing principle is directly connected with dyeing acetate blends with the newer synthetics. From our experience with dynel, we know that, while the cuprous-ion technique could not be applied successfully by a standard method when a mixture of acid and acetate colors is employed, when copper is introduced into the dyebath after the acetate color has exhausted, good results are obtained. The procedure of adding reduced copper sulfate slowly and uniformly is referred to as the drip method, which can be applied to both dynel and Orlon.

When blends of acetate-Orlon or acetate-dynel are to be dyed, this principle offers a solution to the production of solid shades. In brief, both acetate colors and acid colors are added to the dyebath and the former are exhausted on the acetate component. When this is accomplished, a mixture of cupric sulfate and hydroxylammonium sul-

fate is prepared outside the bath by first dissolving each compound in warm water, cooling down by adding cold water to each solution, and, finally, adding the cold solution of hydroxylammonium sulfate to the cold solution of cupric sulfate. The dyebath is acidified with sulfuric acid to a pH of 5, and the resultant cuprous solution is added or dripped into the boiling bath over 30 minutes. It is clear the acetate colors must be exhausted on the acetate fiber before the reduced copper solution is added, since this addition is accompanied with a large drop in the pH value of the dyebath. The same principle can be applied for dyeing such blends as Dacron-Orlon 41 or Dacron-dynel, although in the latter case a limited number of solid shades could be obtained with acetate colors only.

ALL-SYNTHETIC BLENDS——— Finally, a few words about blending synthetic fibers with each other. Many such blends have recently appeared on the market, and we are daily called upon to match shades on such blends as Dacron-nylon, Dacron-Orlon, Orlon-nylon, Vicara-nylon. Dyeing solid shades on a Dacron-nylon blend is a difficult proposition since acetate colors have almost invariably a higher affinity for nylon than Dacron. The results vary with individual fabrics, but in some cases it has been possible to obtain solid shades by the use of Velanol TC. The latter is of great importance since the exhaustion of the Dacron component depends on its use, while nylon is not materially affected. Interesting cross-dyeing effects can be produced on this blend by using a mixture of acid and acetate colors as well as Velanol TC or NB as a swelling agent for the Dacron component. Acetate colors will exhaust on both fibers when a swelling agent is used, while acid colors, having no affinity for Dacron, will dye nylon only to produce contrasting effect, such as yellow-green, black-orange, etc.

It is also possible to dye some union and two-tone effects on Orlon 41-nylon blends by the cuprous ion method with Resolin B Paste in the dyebath. As mentioned before, Resolin B Paste is a resisting agent for nylon and will retard the exhaustion of acid colors long enough for the Orlon component to absorb its share of color.

The dyeing of two-tone effects on this blend is usually done by a two-bath method whereby the solid shade is produced in the first bath by the cuprous-ion technique in the presence of Resolin B Paste, and nylon is cross-dyed in the second bath with selected acid colors at a temperature not exceeding 180°F.

CONCLUSION

These are some of the problems that the dyer and chemist are called upon to answer. Often enough, a solution which seems right and practicable today loses it validity in the light of a new development. Many of our answers therefore are tentative and imperfect and, while applicable to one fabric structure or mill, might not prove suitable in all cases. Constant research for better colors and new and simpler methods of application is carried on by all of us, and, although many difficulties and heartaches will be shared by us in the future, the problems, one by one, will be solved as they have been solved in the past.

Oxidizing with Textone

(Concluded from Page P429)

Textone for each thousand yards. The one-pound figure is meant to be a starting point and will no doubt vary with individual cases. Sufficient bicarbonate is used to maintain a pH below 9.5. The oxidizing box is run at 140°F. Of course, a stock solution can be made up to run for long periods of time because Textone—bicarbonate solutions are stable for weeks. A typical stock solution might contain about 20 lb of Textone and 60 lb of bicarbonate. If the bicarbonate in the stock solution is not sufficient to keep the pH below 9.5, solid bicarbonate may be added directly to the box. The washes after the oxidation are run hot, 180-- 200°F.

As in the case of jig oxidation, a brighter shade is obtained than when chrome and acid is used. Usually chemical costs can be cut, and certainly soaping costs can be cut both from the standpoint of the amount of soap used and from the fact that the soaping can be done in the oxidizing box and the box following. Wash and light fastness are good. An additional advantage is that there are no deposits on the cloth that are difficult to remove by ordinary washing.

CONTINUOUS OXIDATION, ACID SIDE———To wind up the discussion of Textone for vat oxidation, I would like to outline its use on the acid side in continuous ranges. The procedure is the same as that outlined above except for the oxidizing box itself and the box immediately following. In this case, Textone is used in conjunction with peroxide, TSPP, acetic acid, and some synthetic detergent for soaping. A concentration of oxidizing agent amounting to about 1 gram per liter calculated as available chlorine is maintained in the oxidizing bath by addition of both Textone and peroxide from the following stock solution:

200 gal water
30 lb Textone
20 lb TSPP
1.5 gal 130-vol peroxide
5 gal 56% acetic acid or 2.5 gal 85% formic acid.

This stock solution is prepared and stored at room temperature. It is fed to the oxidizing bath a rate that will maintain an available chlorine concentration of 1 gpl of whatever is found necessary for efficient oxidation. The temperature of the bath is maintained at 140°F. The stock solution above should not be stored for long periods of time, probably not over 1 day, because the solution in itself is active.

Oxidation by the above process is very rapid and complete. The resultant wash and light fastness properties are good, and the chemical costs compare favorably with chrome and acid.

STRIPPING DYEINGS BY OXIDATION

After all this talk of getting dye onto the fiber, let's turn to a method of getting it off; I'm speaking of stripping nylon and other synthetics with Textone. The use of Textone as a stripping agent has been known for some years and investigation of this material indicates that it is very effective on nylon dyes. For partial stripping, the following is recommended:

Prepare a bath with 4 to 6% Textone and 4% good synthetic detrgent on weight of fiber (owf). Bring the temperature to 120° F and run for 5 minutes. Add 1% of 85% formic acid and raise the temperature to 180 to 190° F over a 10-minute period, and then run for an additional 15 minuts. Drop this bath and rinse well in warm water.

For a full white a two-stage process as given below gives best results:

Prepare a bath containing 2% of 56% acetic acid and 4% of synthetic detergent owf, and raise the temperature of the bath to 180° F. Run the dyed goods in this bath for 5 minutes and add 6% of zinc formaldehydesulfoxylate. Continue the strip for 20 to 30 minutes longer. Drop this bath and rinse thoroughly in warm water for 10 minutes.

Prepare a second bath containing 2% of Textone and 6% of synthetic detergent owf. Bring the temperature to 120° F and strip again for 5 minutes. Add 1% of 85% formic acid, raise the temperature to 180° F over a 10-minute period and run for an additional 20 minutes. Rinse at 160° F for 10 minutes.

South Central Section ——

SILK PURSES FROM SOWS' EARS*

L M MILLER
Armour Chemical Division, Market Development Department, Chicago

INTRODUCTION

COMING from Armour and Company as I do, I have the feeling that some of you at least will expect me to say something about meat and meat prices. And I do have a thought for your consideration as textile men: have you ever stopped to realize how much higher the prices of your steaks and hams and chops might be if the textile industry should suddenly discontinue softening fabrics, should stop using dye assistants, should eliminate spinning oils, or should suddenly be no longer concerned with static problems? A large proportion of all the products you now use for these purposes are derived originally from the meat-packing industry, which forms a large segment of the fats and oils suppliers in this country.

If the meat packer, through chemistry, were not able to utilize everything but the squeal of the pig and the bellow of the cow, it is entirely conceivable that the prices of his edible products would perforce be considerably higher to enable him to stay in business. An ever-growing part of this utilization of by-products is the chemical processing of fats and oils into intermediates and finished chemicals. And the textile industry in particular has benefited greatly through its increasing consumption of these varied and versatile derivatives. The textile industry in this country today is consuming at the rate of several hundred million pounds per year of fat-based materials.

All of you—as working members of this huge textile industry — can undoubtedly tell me as many or more places in your special fields where fat-based chemicals are used than I can demonstrate to you. But perhaps, by taking up the several obvious spots in your industry where fatty chemicals are utilized, I can acquaint you better with the original source of these materials and the chemical properties required to give you the products you use every day in the mill or finishing plant—products which make your job easier, products which enable you to increase production from a given unit, products which improve your quality, and even products which, at least figuratively, help you to produce silk purses from sows' ears.

L M Miller

The enormous volume and versatility of the fat-based chemicals utilized by the textile industry is simultaneously a source of satisfaction and an inspiration for further developments to the fats and oils industry. Fatty materials ranging from the simple triglycerides to complicated surface-active agents for wetting, softening, scouring, water repellency, etc are employed by the textile mills in their efforts to improve quality and increase production. In almost every phase of textile production — from spinning through scouring, sizing, desizing, dyeing and finishing, — fat-derived chemicals form a most important part of processing. Anionic, nonionic, and cationic agents are derived from fats and oils to serve the textile industry. Close cooperation between the textile industry and the fats and oils industry assures continuation of an ever-increasing number of improved chemicals for better textiles.

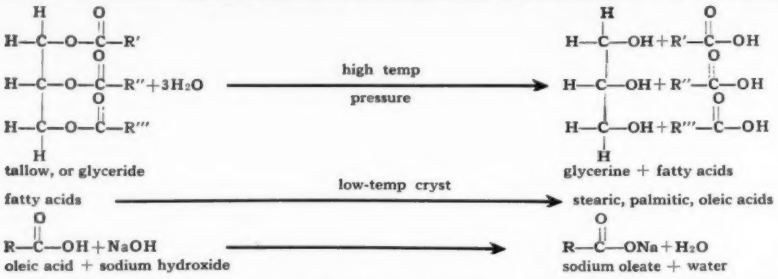
USES OF FAT-BASED CHEMICALS

RAW WOOL SCOURING —— Let us consider first the earliest steps in textile processing where these fat-based chemicals play a part. The scouring of raw wool generally utilizes the free-fatty-acid content of the wool grease in combination with added alkali to form a soap for detergency to remove the dirt, sand, pollen and other foreign matter present in wool as it is received. However, it is still necessary to use additional quantities of soap in this scouring operation, particularly with the coarser grades of wool. The most suitable soaps for raw-wool scouring have a high degree of solubility and rinsibility, must be neutral with respect to either free caustic or free fatty acid, and they must be stable to oxidative rancidity. Now, how do we arrive at a compound—in this case, a soap—which fulfills these requirements, and what are the properties we must build into it to meet these needs? First, in order to have high water solubility and good rinsibility, we will need either a relatively short alkyl chain or, if we are to use a longer alkyl chain, it must have some degree of unsaturation. Soaps from coco fatty acids possess both good solubility and are easily rinsible because the alkyl chain is bon atoms. Oleic acid (or red oil) is composed primarily of 18-carbon atom chains, but, because of unsaturation, or double bonds, in these longer alkyl chains, the titer, which is roughly the melting point, remains low. It follows that soaps from oleic acid, therefore, also have good solubility and rinsibility. Inasmuch as oleic acid is derived from tallow, a domestic material in abundant supply, it is generally much less expensive than coconut oil. We therefore have an ideal starting material for soaps for raw-wool scouring. How about the other end of the molecule—the alkali soap used to saponify the fatty acid into a soap? Generally speaking, either potassium hydroxide or sodium hydroxide will be used. Potassium soaps are more likely to exhibit better solubility at low temperatures, but sodium soaps are cheaper. Since, at the moderate temperatures normally employed for wool scouring, the sodium soaps are just about as soluble and free rinsing as the potassium soaps, the product of choice for best money value is obviously sodium oleate, or the soda soap of a low-titer red oil.

The neutrality of the soap is easily controlled in the manufacturing process and is usually set up as one of the specifications for each product. The control of oxidative rancidity has not been quite so simple, and it has only been recently that stabilizing methods have been discovered and utilized. Compounds such as o-tolyl biguanide, o-biphenyl biguanide, and p-tertiary amyl or butyl phenol can be added to soaps of unsaturated acids to prevent the development of undesirable odor and/or color development. It is possible today to produce fatty acids with such excellent stability that anti-oxidants will not have to be added to the soaps made from them to produce good stable products.

Here, then in simplified form, is the chemistry of the soap you use in wool scouring:

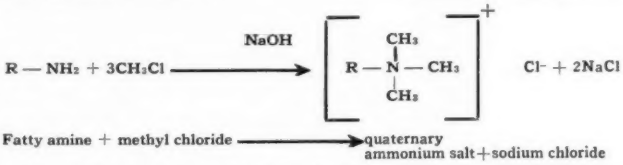
* Presented at the Patten Hotel in Chattanooga, Tenn, on December 6, 1952.



RAYON WET SPINNING——To turn momentarily to another section of the textile industry, I would like to point out another spot very early in the production of viscose rayon wherein fatty chemicals play an important part in maintaining higher levels of production and uniform quality of yarn. As we all know, the spinning of viscose yarn from the xanthate solution is a wet process. The viscose is forced through the fine holes of a spinneret into a water solution containing among other things sulfuric acid and inorganic salts. In order to prevent clogging of the tiny holes of the spinneret and to prevent a build-up of solidified viscose around these small openings, it is necessary to include in this acid bath a powerful surface-active agent. It is readily understandable what troubles crusting or clogging of the spinneret openings could create —uneven yarn formation and breakage and, of course, too-frequent shut downs for clean-ups.

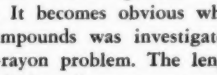
An effective surface-active agent overcomes, or at least greatly minimizes, these difficulties. The standard surfactant which has solved this problem most effectively for the rayon industry is laurylpyridinium chloride, another fat-based chemical. Rather recently, patents have been granted also on the use of another fatty derivative for this same purpose: an ethylene oxide condensate of a fatty amine. Still a third product useful in this application is an alkyl polyoxyethylene glycol amide.

Now let us examine a couple of these compounds from the standpoint of the textile man's requirements to overcome his problem and the chemical structure which the fat and oil chemists arrived at to fit these stated requirements. Laurylpyridinium chloride is a quaternary ammonium salt—a class of compounds sometimes referred to as "invert soaps" or "cationic soaps". You will recall that, in our soap formula, soap was shown to be composed of two parts, a long fatty chain in combination with a metal ion, generally either Na or K. In such a formula it is obvious that the metal portion of the molecule in ionization will carry its normal positive charge. Therefore the fatty portion of that molecule will carry a negative charge. Such a chemical is termed "anion-active" and, although it almost invariably has good surface-active properties, such a compound will not be stable in acid media or in the presence of relatively large concentrations of inorganic salts. Now, the "invert soaps" or quaternary ammonium salts are in many respects the opposite of the anionic soaps. To clarify this further, let us examine one chemical reaction for their formation and their general structure:



You will note that in this formula for a quaternary ammonium salt, the chloride ion (and this could be any of a number of other anions) carries its usual negative charge, leaving the fatty portion of the molecule in this case to carry the positive charge. Such chemicals are identified as being "cation-active" in nature, and they are generally stable in acid and neutral media as well as in the presence of inorganic salts. It becomes obvious why this class of compounds was investigated for the viscose-rayon problem. The length of the alkyl chain, of course, was also a major consideration again because of solubility. The relatively short 12-carbon chain derived from coco oils seemed to fit the bill and is most popularly used, we believe, although here again, it is possible that the unsaturated 18-carbon chain, as derived from oleic acid, could be used.

Another class of compounds which I mentioned as having been recently patented for this use is derived from the combination of a fatty amine and varying amounts of ethylene oxide. Such chemicals have this type of structure:



Although these compounds are ordinarily classified as being cation-active in nature, they actually function more like a nonionic surfactant when more than about 10 mols of ethylene oxide are present in the molecule. They are stable in the presence of acid because they combine with acids to form the substituted ammonium salts, which are quite strongly cationic. Properties of these ethylene oxide condensates can be varied by the chemist in a number of ways. First, the alkyl chain can be varied in length and in degree of saturation. This affects the solubility and the hardness or softness of the compound; a short chain or unsaturation in the chain gives a relatively soft material and contributes somewhat greater water solubility or dispersibility. The length of the ethylene oxide chain plays the most important part in determining the water solubility of the compound. As more and more ethylene oxide is added, that portion of the molecule grows with each addition, making the compound increasingly water-soluble. For this use in the making of viscose yarns, I believe the optimum amount of added ethylene oxide is calculated at about 20 mols. In this specialized and important application, then, these particular fatty chemicals function as dispersants to improve yarn quality and maintain high production standards.

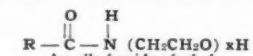
SPINNING LUBRICANTS——Moving along now to another step a little later in the production of woolen fabrics, we find that our fatty chemicals have an important use in the spinning of wool yarns. Some years ago olive oil served as the most important ingredient for spinning lubricants, but the scarcity and high prices of olive oil following both World Wars resulted in the introduction of numerous substitutes. For one thing, it established mineral oils as important ingredients of spinning lubricants, although some proportion of fatty oil has been maintained generally for the advantages it gives in better emulsification and easier scouring, as well as its better spreading and wetting properties, which reduced to practical working terms, means that a thinner lubricant film will suffice. Further, the animal oils present no corrosion problems on metal equipment and they show no deleterious effect on the leather parts of the carding and combing equipment.

Among the many fatty products that go into making wool-lubricating oils are lard oil, peanut oil, sulfonated red oil, neatsfoot oil, cocoanut oil, etc. Most of these materials are simply triglycerides, which means that they have not been chemically changed from the way in which they occur naturally. Almost all of them, without exception, have been pressed, or bleached, or crystallized to give a purified material to meet certain specifications. The lard oil most commonly used in blending a wool

oil is the extra winter strained grade which has been carefully refined to meet a certain melting-point (or freezing-point) requirement and a color requirement. It is also controlled as to free-fatty-acid content as well as to the degree of saturation in the alkyl chains composing the triglycerides. I am sure you are all familiar with these specs set up by the technical committee of the National Association of Wool Manufacturers.

Since most wool oils are applied as emulsions, many of them include not only the natural triglycerides for their ease of emulsification, but also a certain amount of oleic acid or red oil. The red oil combines with an alkali, such as borax or soda, to form soap, which is actually the emulsifier for the system. To assure the textile man an oleic acid that can be used for this purpose, one that may be left on the yarns for extended periods of time without any concern about oxidative rancidity or heating in storage, a great deal of research effort has been put forth by the fats and oils people with the result that it is possible today to procure red oils as greatly superior in this respect to the red oils of yesterday as the new Lincoln is to Henry Ford's first horseless carriage. And it is important to note, I believe, that this major improvement in fatty acids was brought about in the field of fats and oils almost entirely to satisfy a need and desire expressed by you, the textile industry.

New-type wool oils and lubricants have also appeared in the last few years. Because of the many qualities that a good wool lubricant must have, it seems there is always room for improvement in this field, as in most, and here again fats and oils appear, not as the simple triglycerides, but as more or less complicated surfactants to improve hard-water resistance, to provide antistatic qualities, to increase ease of scouring, or to supply added lubricity. It is probably safe to say that the same basic oils originally used are probably still used for the most part today but with mineral oils predominating, principally (let's not kid ourselves) because of better price stability and not necessarily because of superior performance. However, the fatty derivatives, which improve mineral oils to the point where they are suitable for use as wool lubricants, form a most important part of the compounded product. Nonionic surface-active agents are added to increase ease of scouring by easier emulsification of the mineral oils. They perform other functions as well: naturally they are the prime emulsifier in making up the dispersion for application and some of them can also function as antistatic agents. Alkyl amido alcohols, ethoxylated fatty acids, and ethoxylated fatty amides can all be used to impart special properties to wool lubricants. Let us examine the chemical structure of some of these materials and note what it is that makes them so useful here:

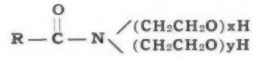


An alkylamido alcohol.

Such compounds are prepared by first reacting a fatty acid with ammonia under proper conditions of temperature and pressure to form an amide and then condensing the amide thus formed with ethylene oxide. A similar type of compound can be prepared also by reacting a fatty acid with mono- or diethanolamine. The properties can be varied by length and unsaturation of the alkyl group as well as by controlling the length of the polyoxyethylene chain. For the best balance of the two parts of the molecule, i e, the oil-soluble amido portion against the polyoxyethylene, or water-soluble portion, to achieve the desired emulsifying properties, the fatty portion of the molecule should probably be derived from coco amide or oleylamide, and the polyoxyethylene group at the other end of the molecule should preferably be of low molecular weight, preferably less than five mols of ethylene oxide.

Compounds which can be used for the same purpose but which have slightly different structures are the ethoxylated fatty acids and fatty amides:

From Fatty Acids ("Ethofats")



From Fatty Amides ("Ethomids")

Characteristics of these compounds can be varied all the way from oil-soluble to water-soluble by controlling the amount of added ethylene oxide as mentioned previously in the case of the ethoxylated amines. In all cases of these condensates of the fatty acids or fatty amides, however, the resultant products are strictly nonionic in character. You will note that the alkylamido alcohol is very similar to the ethoxylated amide (which I will refer to by our trade name, which isn't so much of a mouthful, "Ethomid") except that the "Ethomids" are disubstituted amides, which we feel allows for greater versatility in properties.

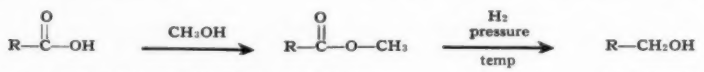
Both of these last two named groups of compounds, the "Ethofats" (or ethoxylated fatty acids)and the "Ethomids" (ethoxylated fatty amides), contain excellent mineral-oil emulsifiers as well as good detergents and wetting agents. By starting with the amide from stearic acid and condensing it with five mols of ethylene oxide, a material is obtained which is oil-soluble, water-dispersible, an excellent emulsifier, and which has the rather unique and valuable property of promoting oil wetting of various surfaces even in the presence of water. It is easy to see that this or a similar compound would be of value in a wool oil, for, in addition to the properties already named, these nonionics are unaffected by hard water, and, when properly chosen, are more free rinsing than soaps.

SIZING COMPOUNDS —— We come upon fat-derived materials again when we enter the sizing room of a cotton or rayon mill. The well-known properties of fats and oils and their derivatives for lubricity, smoothing, spreading and softening earned them a place in warp sizes almost from the inception of sizing compounds. As we all know, the materials which give the yarn strength and abrasion resistance for the weaving operation are, by their very nature, somewhat hard and brittle. To overcome these deficiencies and to give toughness, lubricity, and smoothness to the size, fatty materials are added. Sulfonated oils or tallows have been used for years and are probably among the best softeners for this purpose. The base oil or tallow is usually sulfonated only lightly for this use —just enough to give a reasonable degree of water dispersibility. In order to achieve maximum softening action per molecule, the 18-carbon-chain oils, such as tallow, are the logical choice. Quite frequently the tallow may be hydrogenated to raise the melting point. These materials, used as the straight triglycerides, are easily emulsified with alkali. They may be sulfonated to increase penetration and at the same time to render them water-dispersible or self-emulsifying. Soaps are sometimes included in a warp size, usually in small quantities (0.1% to 1.0%), to aid in emulsification. They also demonstrate some softening action, but are not used in larger quantities because of their tendency to cause excessive foaming and possible loss of strength in the size film. The cationic fat-derived chemicals present another approach to the softening problem. They are highly efficient in their softening action, only a few tenths percent generally accomplishing the same degree of softening as 1 or 2% of the tallow type of softener. The quaternary ammonium salts mentioned previously in connection with rayon-yarn manufacture represent one type of cation-active substance that could also be used here. You will recall, however, that for rayon spinning we had recommended the quaternary derived from coco fatty acids because of solubility requirements. For this use, which is concerned with softening rather than dispersion, we select the quaternaries derived from longer alkyl-chain base materials—principally tallow or hydrogenated tallow. Such quaternary salts are not water-soluble, but are only dispersible. They are substantive to textile materials, but are removable by scouring with nonionic detergents. Other fatty chemicals which may have application in warp sizes are substituted amides of alkyl phosphates, fatty acid condensates with alkylol amines, and other amino derivatives.

WETTING AGENTS——After cloth has been woven, it must then be sent to finishing to dress it up, so to speak, for sale to the cutters or the consumer. This entails numerous operations from desizing (or removing that warp size we were just talking about) through dyeing and final finishing, which of itself may require a number of steps. But here again, we find that in nearly every operation some fat-derived product is used to give us finally the beautiful and luxurious fabrics turned out by this versatile textile industry.

The first wet-processing operation in the finishing plant is usually desizing. Naturally, the principal ingredient of desizes are enzymes, but the efficiency and speed of this rather time-consuming operation can be improved by the use of wetting agents, many of which are fat derived. Such materials as the fatty alcohol sulfates, the polyglycol esters of fatty acids, the N-substituted taurides of the "Igepon T" type, and many other surface-active agents produced from fats or oils are used to decrease surface tension and increase penetration, thereby speeding up the solubilizing action of the enzymes. In certain cases salts, such as NaCl, $CaCl_2$, or KNO_3, accelerate the enzymatic action and are often included in the desizing agent in manufacture. In these cases, any surfactant used with the enzyme must be compatible with the salts. Now let us examine some of these wetting or penetrating agents to see what makes them effective in lowering surface tension so efficiently as often to permit slicing hours off the desizing operation.

The fatty alcohol sulfates are produced from alcohols obtained by catalytic hydrogenation, at high temperatures and pressure, of fats, fatty acids, or methyl esters of fatty acids containing the desired length of alkyl chains. A sodium reduction process yields alcohols also, although the yields are generally not so high as with high-pressure hydrogenation.



fatty acid + methyl *alcohol* → *methyl ester* *fatty alcohol*

The fatty alcohol thus produced is not water-soluble because of the alkyl chain length, so it must be reacted with sulfuric acid:

$$R-OH + HOSO_2OH \rightarrow R-O-SO_2OH + H_2O$$

fatty alcohol + sulfuric acid → fatty alcohol sulfate + water

This sulfated alcohol is water-soluble and surface-active, although most of the commercial wetting agents of this type have been further reacted with NaOH to give the sodium salt:

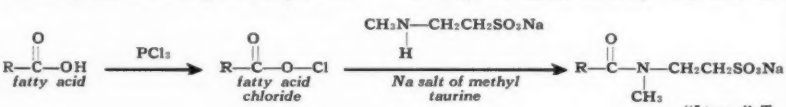
$$ROSO_2OH + NaOH \rightarrow ROSO_2ONa + H_2O$$

The sodium salt has increased penetrating power because of better solubility and the sodium salts generally show less tendency to corrode metal equipment.

These compounds, although anion-active, are less susceptible to formation of scums or curdy precipitates than the conventional fatty acid soaps. This is readily understandable since the Ca or Mg salts of the sulfated alcohols are relatively water-soluble in contrast to the same salts of the corresponding fatty acids. The sulfate group apparently is responsible in a large measure for this solubility, possibly because of hydration.

Another class of compounds possessing wetting and penetrating properties is derived from fatty acids and ethylene oxide. These are the "Ethofats" mentioned previously, "Sterox" CD, "Advawet" NA-6, to name a few. The "Ethomids", condensates of fatty amides with ethylene oxide, might also be considered with this group, since they are all nonionic, and the chemical structures which influence the penetrating properties of one seem to apply to the other. Although good water solubility is sometimes associated with good penetrating power, we find that increasing the ethylene oxide content of these compounds—which is the best way of increasing their water solubility—does not necessarily improve the penetrating power or wetting action. Instead, we find that those compounds which have less than ten mols of ethylene oxide added, and preferably only about 5 or 6 mols, show maximum lowering of surface tension. However, at the other end of the molecule, we do find that shorter alkyl chains are helpful in obtaining better wetting power and that a 12-carbon chain with the same amount of ethylene oxide added is anywhere from 5 to 50 times more rapid in its wetting action than a saturated 18-carbon chain. If however, the 18-carbon chain is unsaturated (as with red oil), the wetting power will fall somewhere between the two. We can conclude, therefore, that the best of this class of wetting agents will probably be derived from coco fatty acids with between 5 and 10 mols of added ethylene oxide.

The "Igepon" T type of compound is also fat based, usually derived from oleic acid or red oil. The fatty acid is reacted with PCl_3 to give the acid chloride, which, in turn, is reacted with the sodium salt of a taurine derivative to give this picture:

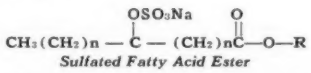


"Igepon" T

With this type of compound, variations in properties can be produced by employing different alkyl chains in the parent fatty acid or by substituting the alkyl groups on the nitrogen of the taurine portion of the molecule. Those derived from coco fatty acids have high foaming properties and good wetting action, those from oleic acid are also very good penetrants but with somewhat lower foam formation, while those derived from stearic acid can be expected to show good detergency at higher temperatures. Decrease in foaming properties can also be realized by increasing the number of carbons in the N-substituted alkyl group of the taurine.

REWETTING AGENTS——Closely related to the wetting agents are the rewetting agents, which we should mention in this discussion even though they are not particularly applicable as desize assistants. While a rewetting agent must necessarily be a good wetting agent, it does not follow that all wetting agents possess rapid rewettability. All of the structural factors which distinguish a rewetting agent from a wetting agent are not known. However, it has been observed empirically that those wetting agents which are liquids or noncrystalline solids when dry are also usually good rewetting agents.

To obtain good compressive shrinkage of cotton goods, rapid and uniform rewetting is essential. Rewetting is also helpful in obtaining uniform pickup of resin from solution in treating fabric for shrinkage control or crease resistance. The fatty chemicals found most suitable for rewetting generally come from the class of sulfated fatty acids or fatty acid esters. "Twitchell" 7250 Oil, "Parapon," "Surfax WO," "Warcosan," are all representative of this type:



Sulfated Fatty Acid Ester

The R in the formula is generally derived from a short chain alcohol such as methyl, ethyl, or butyl, and the remainder of the molecule comes from an unsaturated acid, such as oleic or ricinoleic. These products are liquid, which undoubtedly is a partial explanation of their rewetting properties. Esterification blocks the carboxyl group of the fatty acid, rendering these compounds less sensitive to water hardness. Sulfation at the double bond of the unsaturated acid contributes the hydrophilic group necessary for surface activity.

SCOURING AGENTS —— Scouring agents, as a group, probably constitute the largest single class of fat-derived chemicals used by the textile industry. The most im-

portant single property required of a scouring agent is good detergency, which includes the ability to wet out and penetrate fibers readily, to emulsify soil, and to hold that soil in suspension until it can be washed away.

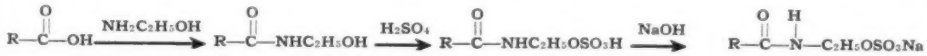
Selected members of many of the classes of chemicals already mentioned act as detergents. The soaps, certainly, the polyoxyethylene esters and ethers, the sulfated alcohols, and the fatty amide sulfates can all act as textile detergents.

A number of factors, such as permissible temperature, inorganic salts present, or water hardness, pH of the scouring bath, and even the type of soil to be removed, all determine the most effective detergent to choose. The detergent power of these surface-active agents is usually enhanced by the addition of inorganic salts, such as the polyphosphates, carbonates, etc, and by such organic builders as sodium carboxymethyl cellulose and/or the chelating agents.

In the absence of heavy metal ions, the normal fatty-acid soaps are perhaps the most efficient of all detergents. Where high temperature scouring is permissible, as with all cotton fabrics, the best detergency can be obtained with the high-titer soaps, i e, those derived from tallow fatty acids. In the case of woolens and some of the synthetic fibers, where low temperature scouring is a necessity, more soluble soaps, such as oleates or coco fatty acid soaps, must be used.

One of the principal reasons for the development of synthetic detergents has been that the ideal situation of large supplies of soft water does not exist everywhere and the synthetic detergents, both anion-active and nonionic, are much less sensitive to hard water than are the soaps. This decreased sensitivity has been accomplished in a number of ways. As mentioned for the sulfated esters under wetting agents, it can be achieved by blocking the carboxylic groups of the fatty acid through esterification, and then introducing a hydrophilic group by sulfonation to give the product surface activity.

Other fatty detergents which are stable to hard water are the sulfated alkylol amides. These products result from the condensation of a fatty acid and monoethanolamine, followed by sulfation of the hydroxyethyl amide:



Here we have blocked the carboxylic group by forming an amide linkage and introducing nitrogen into the molecule. The alkylol amide itself is somewhat surface-active, but better solubility is produced by making the sulfated sodium salt. Even in the presence of hard water, which would perhaps result in formation of the calcium or magnesium salt, these materials remain soluble and do not lose any appreciable detergency.

As with soaps, the best detergency will be obtained from those anion-active synthetic detergents whose alkyl chains are in the 18-carbon range if sufficiently high temperatures are permissible. In addition to the normally expected softening of soil and aid to detergency imparted by hot water itself, the emulsification properties of the longer alkyl-chain compounds —— in their specific solubility range —— are generally better than those of the shorter alkyl-chain materials in their solubility range.

The nonionic detergents (principally ethylene oxide condensates of fatty acids, alcohols, amides, etc) are a special class unto themselves in the scouring field. They are stable to acids as well as to hard water. There are nonionics which are efficient at extremely low temperatures and yet insoluble at high temperatures. They show little or no adsorption on textile fibers and are extremely free rinsing. Low sudsing is characteristic of most of these compounds ——an advantage in the textile mill, but a sales hazard in the retail market.

ACID FULLING——One point of application wherein these nonionics are peculiarly suitable is in the acid fulling of woolens. The requirements for a surfactant in this application are that it be stable to acid, have good scouring and penetrating properties, provide fiber lubrication, be nonsubstantive to wool fibers, and be low sudsing. The nonionics certainly fit these qualifications better than any other class of surface-active agents.

DYE LEVELING——We have now completed the preparation of yarns or fabrics for dyeing and the glamorizing of the textile for the ultimate consumer. Here again, the fat-derived surfactants enter the picture to assist the dyer in obtaining level, uniform shades and to reduce troublesome rejects or seconds.

Both anion-active and nonionic agents are used as dye-levelers. In the dyeing of wool, the anionic surfactants such as the sodium salts of alkylamido sulfates or the sodium alcohol sulfates are most effective. The most popularly used dyestuffs for wool are acid dyes, which are for the most part aromatic sulfonic acids. Wool, being an amphoteric substance, contains both carboxy and amino groups. The sulfonic-acid anions of the dyestuffs are attracted to and firmly held by the amino groups of the wool. Without a "regulator" in the dyebath, this very strong attraction can result in uneven dyeings. By adding an anionic surfactant, a competition is set up and the dyeing action——or absorption of the dye particles——is slowed down because the anion of the surfactant is also strongly attracted to the amino groups of the wool. Because this mechanism is not generally understood, selection of the most suitable surfactants has been made only on an empirical basis.

Dye levelers for use with the cellulosics are generally nonionic surfactants. The action of the nonionics in the case of vat dyes seems to be agglomeration of the molecular particles of the leuco derivative to a size where penetration within the fibers becomes more difficult and exhaustion of the color is thus reduced or slowed down. Excess of the surfactant can inhibit dyeing almost completely. This same property can be utilized in dyeing cottons and viscose rayons with direct or basic colors. It has been fairly well established that the alkyl chain of oleic acid (18-carbon, unsaturated) combined with about 20 to 25 mols of ethylene oxide affords an excellent combination of properties for a dye leveler.

The dyer (for one reason or another) must often resort to stripping of color. This property of the nonionic surfactants which we have just discussed can be useful in assisting color removal. The stripping agent performs the actual dye solubilization, but as the solubilized dye particles emerge from the fiber, they will have a tendency to redeposit. With an excess of one of these surfactants present——perhaps 4 to 5 times the amount used in dyeing—— the particles are agglomerated and prevented from re-entering the fiber, thus giving a cleaner bottom more quickly for redyeing or finishing.

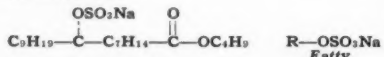
FINISHING AGENTS——When a fabric has been dyed, it enters the finishing department for the final touches which make the fabric shrink-resistant, soft or firm, water-repellent or any of a dozen of other things demanded by the buyers of the finished wares of the textile industry.

Knit goods, for example, often require a special finish to be saleable to certain trades, such as scroop, a somewhat nebulous term denoting a type of crunchy feel. This effect has been achieved in one case by using nonionic surfactants to prepare emulsions of the fatty alcohols of corresponding molecular weight. About 30% emulsifier is used with about 70% of the fatty alcohol. A small amount of turpentine may be included as well as some paraffin or wax to thicken to a paste. The emulsion is used at a concentration of 0.2 to 0.3% at 104 to 122°F for finishing millinery goods, hosiery, knit goods, or rayon filament or staple. Apparently the scrooping effect is

due, at least partially, to the waxy nature of the fatty alcohol coupled with its relatively low lubricating properties. The fatty nonionic emulsifier is used merely as the means of depositing the water-insoluble alcohol on the fabric in a convenient manner.

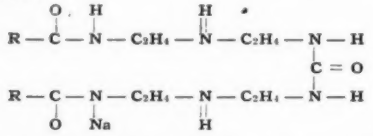
Softening compounds are almost universally derived from fats or oils. Those materials used as finishing softeners are all surface-active compounds and may be either cationic, anionic, or nonionic, although, since the latter group has no substantivity for textiles, the softeners in this group are relatively few.

The sodium fatty acid ester sulfates and the long-chain alcohol sulfates are representative of the anionic compounds used for softening.



Sodium fatty acid ester sulfate — *Fatty alcohol sulfate*

Generally speaking, the anionic softeners claim the advantages of minimum yellowing on white goods and minimum effect on the light fastness of direct dyes. They are not substantive to textiles and therefore have no durability to laundering or dry cleaning. There are a few so-called substantive anionic softeners on the market, one of which is represented by the fatty carbamide salts:

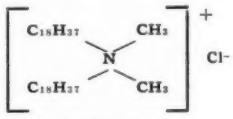


This compound can be formed by reacting diethylene triamine with fatty acid to give the monoamide. Two mols of the monoamide condense with urea to give the carbamide. Reaction with sodium hydroxide gives the sodium salt, which contributes the water dispersibility.

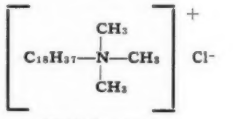
The nonionic compounds showing most promise as softeners are mono-fatty acid esters of polyhydric alcohols condensed with ethylene oxide or the simple esters of the fatty acids with polyethylene glycols. Here it has become apparent that those materials are the best softeners which are composed of the longer alkyl chains and a relatively small amount of ethylene oxide as the hydrophilic portion of the molecule. This permits more heavy fat loading per mol and only enough ethylene oxide is needed to give a reasonable degree of dispersibility to the compound. These nonionics are probably more often used in combination with a cationic softener than as the softener *per se*.

Cation-active materials present some interesting advantages as textile softeners. Because of their substantivity to textile fibers in general, they impart a more permanent softening effect than either anionic or nonionic compounds. Furthermore, they are highly efficient, achieving the same degree of softness at much lower concentrations. They can be applied either by exhaustion from the last rinse following dyeing or by a padding operation.

It seems to be true that, with all of the fatty compounds used for textile softening, the alkyl chain most satisfactory is the saturated 18-carbon-atom chain. This permits maximum fat loading per molecule, as mentioned previously, and complete saturation minimizes any tendency to yellowing. Another factor which seems to have some bearing on the softening properties is the type of colloidal dispersion attained with such a compound. The compounds containing the saturated 18-carbon-atom chain are more likely to form cloudy colloidal dispersions, given the same chemical configuration, than the same compounds containing a 12-carbon chain or containing unsaturation within the alkyl group. We also believe that a dialkyl chain on a quaternary ammonium salt contributes more total sofetning effect and greater efficiency per mol than the same type of salt containing only a single long fatty chain. The following formulas demonstrate the two types of quaternary ammonium salt:



Dialkyldimethyl-ammonium chloride

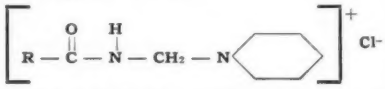


Alkyltrimethyl ammonium chloride

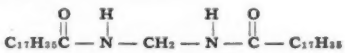
Many of these same cationic softeners possess other properties of value to the textile finisher. For example, most of the quaternary ammonium salts show strong germicidal activity. The bacteriologists and microbiologists have told us, however, that in general those quats having the shorter alkyl chains or some unsaturation in the longer chains are better bactericides than those which are usually preferred as softeners. The antistatic properties of cationic softeners are gradually being recognized, although I do not believe it is possible yet to relate their efficiency as antistats to their chemical configuration. It appears also that there is some degree of specificity with different fibers. It was first felt by some that because the fatty portion of these materials carried a positive charge as contrasted to the relatively negative charge of most textile materials, that it was simply a matter of neutralizing charges.

This is not the whole story inasmuch as there are a number of nonionic compounds which demonstrate antistatic properties also. It seems quite likely that the hygroscopicity of some of these latter materials has a distinct bearing on the problem, and it may well be that a combination of charge neutralization, increase in surface conductivity, and moisture take-up will have to be worked into one finishing mixture to combat build-up of static electricity successfully.

There is one more finishing application in which fat-derived chemicals play such an important part that I believe it is worth mentioning in closing this discussion. This is in the field of water repellents, particularly the durable repellents, such as "Zelan," "Velan," "Norane," and "Permel." All of these products are fairly complex fatty chemicals, and details of manufacturing methods are not public information. However, the patent literature discloses general methods and formulations. We will examine only one of these, "Zelan," a stearamidomethylpyridinium chloride.



This is obviously a quaternary ammonium chloride (and, incidentally, can be used as a softener). This particular quaternary salt is designed to be especially unstable to heat. The compound is applied in a water-dispersed form which, upon drying and heating, decomposes with the liberation of pyridine and HCl to deposit on the fibers a water insoluble coating, probably of methylene bis-stearamide:



The two long stearic chains connected through the diamido methylene linkage are responsible for the high melting point and the insolubility of the coating in water and most organic solvents.

SUMMARY

I am sure we all recognize that there are dozens of other places in your industry where fat-based compounds are utilized, or perhaps could be utilized, to advantage. Our fats and oils industry is constantly searching for new compounds and new uses for those compounds that we already produce. On the other hand, the textile industry is alert and open-minded and is always searching for improvements in their processing. I hope that I have succeeded in demonstrating the wisdom of our two industries collaborating for progress. We welcome your inquiries. We sincerely believe that your problems are our problems and that working together for their solution can only result in great mutual benefits.

Accelerated Laboratory Test—

(Concluded from Page 424)

Table V gives the extent of yellowing by numerical classification of the pressed fabrics. Of those fabrics treated with 0.5 percent chlorine, the melamine-finished fabrics showed the greatest amount of yellowing. Before pressing and after 20 and 40 seconds of pressing, the majority of these fabrics were in Class 2 (slight yellowing). After 80 seconds of pressing, the melamine finished fabrics were in Class 3 (marked yellowing), with the exception of one case.

"Melamine" fabrics treated with 0.13 percent chlorine were judged in the great majority of cases as Class 2. At this concentration of chlorine, only two cases fell in the Class 3 group.

In the 0.015 percent chlorine treated group, none of the control fabrics showed any yellowing, whereas many of the melamine finished fabrics were yellowed on light exposure and pressing to the extent of Class 2.

At all concentrations of chlorine, the dress finished fabrics were generally in Class 1 (no yellowing).

ACKNOWLEDGMENT

The author is deeply indebted to Frederic Bonnet, Arthur R Wachter, and Ralph Riegner of the American Viscose Corporation, and to Pauline Beery Mack, former Director of the Ellen H Richards Institute at The Pennslvania State College, and Dean of the College of Household Arts and Sciences, Texas State College for Women.

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ABSTRACTS

Whither Man-Made Fibers?

A H Wilson, *J Textile Inst* 44, P130-144, April, 1953.

During the past 15 years the competitive position of cellulose acetate has improved relative to that of viscose, partly because of a change in the relative costs and partly because fashion and taste have favored cellulose acetate fabrics. The advent of nylon has pressed on viscose in the stocking field and will press on cellulose acetate in the warp knitting field, and unless these pressures can be relieved by an increase in exports, large reactions are likely to occur. Considerable effort will be made to improve the competitive position of each fiber in the nearly saturated silk field by technological improvements and by intensive use-development. It seems unlikely that, apart from nylon and Terylene, any new synthetic fibers will establish themselves in this field.

Viscose has an effective monopoly of the large tire cord market, and it is likely to retain it, though the size of the market is such that every synthetic fiber will attempt to capture some of it.

The level of production of viscose staple fiber must depend to a considerable extent upon the price of cotton and the availability of dollars with which to purchase it, but particularly in view of the recent very large expansion, it seems unlikely to increase much more unless improved properties can be imparted to it either by improvements in its manufacture or by blending it with hydrophobic fibers.

The greatest scope for new synthetics seems to be in invading the wool field, since the high price of wool makes it particularly vulnerable. To achieve this, formidable technical problems and prejudices will have to be overcome, but the prize is so great that considerable efforts will be made to win it.—WHC

The Influence of Particle Size on the Dyeing Properties of Vat Dyes

T Flanagan, *J Soc Dyers & Colourists* 69, 18-22, January, 1953.

Owing to the difficulties involved in the application of vat dyes to viscose rayon cakes by the normal direct vatting methods, stress has been laid in recent years on pigment-padding techniques. The Abbot-Cox process is typical, and since in this method dyeing of the padded cake is supposed to take place *in situ,* there should be no large return of reduced dye from the cake to the dyebath. Hence the difficulties associated with direct vatting methods are eliminated.

If this theory is correct, it is necessary to pad the yarn evenly in order to obtain a level dyeing. Experience in the vat dyeing of viscose rayon cakes has shown that level pigmentation is rarely obtained, anl therefore, on the basis of the Abbot-Cox process, this would appear to be one of the main contributory factors to irregular dyeing. One cause of uneven pigmentation lies in the variation in particle size of the commercial vat pastes supplied by the manufacturer, and this led Hampson to carry out experiments with dye pastes which had been reground in a ball mill to reduce the particle size and break up aggregates. To compare the particle sizes of the commercial vat pastes he evolved a simple filtration test, using two thicknesses of No. 1 Whatman filter paper as the filtration material.

An attempt has now been made to assess the importance of the particle size of commercial vat dyes as a factor influencing level dyeing, when using the padding technique in dyeing viscose rayon cakes. A number of dyes have been subjected to the Hampson filtration test (which is described) and classified according to particle size. A similar classification has been based on filtration of dye from the padding liquor during the actual dyeing process. A fair degree of correlation between the two methods has been established. Some factors affecting the filtration properties of the vat dyes have been investigated.

The classification of dyes according to particle size has been compared with actual dyeing results. It has been found that in the case of dyes with a high rate of "strike" (speed of dyeing) and poor leveling properties, some advantage is obtained by virtue of the more level pigmentation resulting from the use of dyes of small particle size. In general, however, it is concluded that particle size is not a major factor affecting the dyeing of viscose rayon cakes with vat dyes, and that a more important part is played by the migration of the leuco vat dye. This migration is promoted by dyeing at elevated temperatures, and, with many dyes, is influenced by the concentration of leveling and dispersing agents, such as Disperson VL.—WHC

NEWS

• Dow Corning Tenth Anniversary

The tenth anniversary of the founding of the Dow Corning Corporation was recently observed at the headquarters of the organization in Midland, Michigan. Behind the formation of the company was nine years of basic research in the field of silicone chemistry and some forty years of chemical processing background —the research provided by a group of physicists and chemists at the Corning Glass Works and the chemical background by the Dow Chemical Company. The two firms joined forces to form the Dow Corning Corporation in February of 1943.

During the first 8 years after 1943, Dow Corning doubled, redoubled and doubled again its productive capacity. Gross sales increased from $15,000 during its first full month of business to $1,500,000 a month currently. An investment of about $16,000,000 in a new expansion program should give it a fourfold increase in capacity in a year or so.

The first products made by Dow Corning were special silicones, almost wholly for use in military aircraft. With no civilian business to fall back on at the end of the war it was necessary to develop wholly new products for peace time use. Among the products since developed were: rubber tire mold release agent; bakery tin release agent; electrical insulating resins; paint resins; lubricants; "Silastic" silicone rubber; pressure sensitive silicone adhesives; silicone finishes for textiles; silicone-alkyd resins for protective coatings.

Dow Corning has a closely-knit organization of Research, Product Engineering and Sales Development personnel to undertake the rapid development of new silicone products tailored to meet the needs of industry. There are about 200 engineers and scientists in their present total of 950 employes.

In 1945 Dow Corning began the cultivation of international interest in the practical uses for silicones. Commercial development followed quickly and has progressed steadily and today Dow Corning owns an interest in operating companies in England and France while licensees produce silicones in England, France and Germany. Distributors sell their products in over twenty other countries.

• Standard Chemical Buys Charlotte Site

Standard Chemical Products, Inc, Hoboken, N J, has purchased a large site at Charlotte, N C, for the construction of a 50,000 sq ft textile chemical plant. Investments in the proposed Southern headquarters will approximate $750,000, it is reported.

The structure, which will provide for warehousing and distributing of the Company's products as well as their manufacture, will include modern laboratory facilities to assist customers with their dyeing and finishing problems.

Louis L Grombacher, SCP president, has stated that the contract for construction will be awarded this month and the plant will probably begin operations early next autumn.

It is anticipated that the combined production of the Hoboken and Charlotte plants will double the Company's output.

• Bancroft Granted "Textralizing" License

Joseph Bancroft & Sons Company, Wilmington, Del, has been granted an exclusive license by Alexander Smith, Inc, White Plains, N Y, to the process for crimping textile fibers and yarns known as "Textralizing".

According to W R MacIntyre, Bancroft president, the licensing agreement includes the right to sublicense others, both in the United States and in foreign countries, under inventions relating to the crimping methods and apparatus, setting the crimp, and to the crimped product.

The "Textralizing" process was developed by Alexander Smith engineers to crimp naturally straight wool fibers in order to improve their usefulness as carpet wools. Subsequent research indicated that the process could be applied to a wide variety of textile materials, both natural and synthetic, and thus had importance throughout the entire textile field. The Bancroft Company will extend the process into this broader field.

Mr MacIntyre said that the licensing programs and further research and development will be handled by Bancroft's "Everglaze" Service Department under the direction of Arnold L Lippert, vice president in charge of research and development.

• Sandoz Housewarming Attracts Over 300

Over 300 people, representing every state in New England, attended the housewarming of Sandoz Chemical Works, Inc's New England Office in Hudson, Mass, on May 22.

Offices and laboratories as well as the extensive warehouse and standardizing facilities at the new location were exhibited.

• New Rapid Method of Evaluating Fabrics for Resistance to Atmospheric Fume Fading

After two years of unsuccessful attempts a simple method of rating acetate fabrics for gas fading has been evolved according to Dr T G Hawley, Jr, Chairman of the Simplified Test Committee of the AATCC. The test was developed by a committee member, A L Polese, textile engineer formerly associated with A M Tenney Associates, Inc.

Primarily the test depends upon a base test cloth which is made by impregnating it with a solution of sodium nitrite. In the test the base cloth is moistened with an acid solution and covered with a moisture barrier and the sample to be tested. A heated hand iron, set at 200°F, is applied to this triple decker "sandwich" for two minutes, after which the sample can be classified visually for fading.

Refinements in procedure and test conditions have been worked out by G J Mandikos, AATCC Research Associate at Lowell, and his work shows excellent results which duplicate the time-consuming regular method.

The new rapid test can be controlled to give any desired degree of fading and it is expected that accurate correlation of test results can be obtained by different laboratories. However, interlaboratory tests are still to be conducted before final approval by the AATCC research body.

The test is seen to have great use as a screening medium in quality control work on normally dyed acetate fabrics and inhibitors. Anyone interested in further details of this test method should forward inquiries to Dr T G Hawley, Jr, United Merchants Laboratories, Inc, 601 West 26th St, New York 1, N Y.

• Fink, Shiraeff Win Awards at GDC-GAW Painting Exhibition

F R Fink holding his prize-winning painting, "Early Snow." On the left is A E Hendershot, treasurer, and on the right R R Moore, assistant to the vice-president, and J J Speed, personnel manager.

The eighth exhibition of paintings and drawings of employees of the General Dyestuff Corporation and of General Aniline Works ended last month with first prize awarded to F R Fink for his painting, "Early Snow". Second prize went to D A Shiraeff for "Riverside Drive, Near Barnard College."

A total of 30 entries, including oils, water colors, charcoals and crayons, were judged by A E Hendershot, treasurer of the company; T R Moore, assistant to the vice-president, and J J Speed, personnel manager.

Honorable mentions were awarded to L Fusser, E Fitchmueller, H Luttringhaus, E Smetak and H F Weidman.

The exhibitions heretofore have been restricted to employees at the company's headquarters in New York, but in the future they will be open to GDC and GAW employees throughout the country. Another innovation in the future will be to award prizes on the basis of ballots cast by visitors to the show, rather than by decision of the judges. The next exhibition will be held the third week in December.

• CCNE Outing

The Annual Spring Golf Outing of the Chemical Club of New England, held in ideal weather at the Wannamoisett Country Club, Rumford, Rhode Island, Thursday, June 11th, attracted approximately 110 members and guests. In addition to numerous door prizes there were the usual awards for golfers. H C Milton, William Connors, and Mel Stalker (in that order) were awarded the first three low gross prizes.

President Edward C Richardson announced that the annual Baseball Party would be held in Boston on July 29th.

• Jones & Hunt to Represent National in New England

The newly organized firm of Jones & Hunt, Inc, has been appointed by The National Drying Machinery Company, Philadelphia, as their Sales Representative in the New England Territory, to handle sales and service on "National" textile and chemical dryers of all types.

B M Jones, head of the Jones & Hunt organization, was recently Gen Sales Mgr of the Rodney Hunt Machine Co, in charge of sales and development of that company's textile machinery, chemical processing equipment and water control apparatus. For a number of years prior to that, he was manager of their Textile Machinery Division.

Associated with Mr Jones is Larry Hunt, who served as Sales Engineer of Chemical Processing and Textile Machinery for the Cherry-Burrell Corp and the Rodney Hunt Machine Co.

Inquiries in connection with sales and service of National machinery and equipment in New England should be addressed to: Jones & Hunt, Inc, Emerson Ave, Gloucester, Mass.

• Argentine Licensee Produces First Million Meters of "Everglaze" Fabric

Brillotex Company, Buenos Aires, Argentina, the South American licensee of Joseph Bancroft & Sons Company, Wilmington, Del, has produced its first million meters of "Everglaze" fabrics only eight months after operations began, according to a June 11th communication from S Eric Kluger, Brillotex president, to W R MacIntyre, Bancroft president.

• Aula Announces New 7000 Line of Pigment Printing Colors

Following upon the recent announcement that three patents covering the use of water-dilutable pigment printing colors had been granted to Laszlo Auer, President of Aula Chemicals, Inc, the Company has introduced the 7000 Series of water-dilutable Aulabrite colors.

According to Leslie L Balassa, Vice-President of Aula, the production of the new series "opens the door to the expanded use of Aulabrite Colors in applications where high color intensity coupled with economy is a must". The 7000 Series is said to maintain the characteristics of Aula's 1000 Series.

Copies of a new bulletin describing the 7000 Series may be obtained by writing to Aula Chemicals, Inc, P O Box 494, Elizabeth, N J.

• 55th LTI Commencement

The fifty-fifth Commencement exercises at Lowell Technological Institute opened on Sunday, June 7, with the Baccalaureate Service in the First Congregational Church in Lowell, Mass, with an address by Dr Albert Buckner Coe, president of the Massachusetts Congregational Conference.

Degrees were awarded to more than one hundred candidates at exercises held on Monday morning, June 8, in the Murkland Auditorium of the Bartlett Junior High School in Lowell. The Commencement address was given by Joseph H Sutherland, president of J P Stevens & Co, Inc, who was also a recipient of one of six honorary Master of Science degrees.

The exercises included the awarding of the National Association of Cotton Manufacturers' medal to the outstanding student in cotton manufacturing and the AATCC book prize which goes to the top student in textile chemistry.

This year's honorary degree recipients, in addition to Mr Sutherland, included Dr Frederick M Feiker, former dean of the school of engineering at George Washington University and prominent textile education consultant; Jewett T Flagg, president and treasurer of the Flagg-Utica Corporation; G Gordon Osborne, president and treasurer of Warwick Mills; Julian S Jacobs, editor of the *Textile Research Journal;* and Mrs Edith Nourse Rogers, Congresswoman from the Fifth Congressional District of Massachusetts.

• American Arolac Moves New York Offices

American Arolac Corporation has announced the removal of its New York offices to larger quarters at Suite 7810, Empire State Building, 350 Fifth Avenue, New York 1, N Y. Telephone OXford 5-2482.

• AAP Sales Convention

A variety of technical discussions on some of American Aniline Products, Inc's newer products and improved methods of application technique highlighted the Company's national sales convention June 11-12 at the Lock Haven, Pa, factory. Particular reference was made to the newly released range of Amacel Colors, which have been specially designed for printing.

Those in attendance included the entire American and Canadian sales staffs, along with application technicians from each sales district. The entire sales force, in small groups, were taken on a comprehensive tour of the factory.

An afternoon of sports activities featured an inter-company golf match, which was utimately won by factory personnel.

The final note of the convention was a banquet at the Lock Haven Country Club, which featured an address by George L Armour, president.

• MCA Plans Expanded Program

Keeping pace with an industry that has grown four-fold since 1939, the Manufacturing Chemists' Association has an expanded program of activities planned, according to remarks made by Charles S Munson, president, before more than 500 members from 100 chemical companies attending the 81st annual meeting at the Greenbrier Hotel, White Sulphur Springs, W Va, on June 11.

The first full-time Association officer, William C Foster, was nominated to succeed Mr Munson in the presidency. Mr Munson, who is chairman of the board of Air Reduction, assumes the same post in MCA for the coming year.

In a progress report reviewing the year's activities Mr Munson pointed to the interest in the Association's newly inaugurated mid-winter meetings, the growth in membership, and the intensive state and regional activity. Producers of 90% of the nation's chemical production are now enrolled in MCA.

Among noteworthy achievements of the year in public relations was the preparation of "The Chemical Industry" Facts Book, a nontechnical collection of current information which has been widely distributed.

The 25 committees which administer the Association's technical program have also stepped up activities, and the work of one committee alone is said to have resulted in a saving to the industry of 10 times the Association's annual budget. More than 100 different technical publications are now stocked by Washington headquarters.

• Ruger Textile Color Co Moves to Brewster, N Y

After 33 years of business in Brooklyn, N Y, the Ruger Textile Color Co has relocated its offices in Brewster, N Y. Factory and warehouse is located at 72 Michigan Ave, Paterson, N J.

Ruger handles a line of acetate browns, and black for white discharge, and does acetate application printing.

• FMC Begins Deliveries of Soda Ash from Wyoming Plant

With soda ash refining facilities at their Westvaco, Wyoming, plant having reached commercial production levels, Food Machinery & Chemical Corporation began deliveries on June 15.

The facilities reportedly constitute the first wholly new soda ash manufacturing operation since 1935 by the first new producer to enter the industry since 1912. FMC's Westvaco Chemical Division is operating the plant for the Intermountain Chemical Company and is also acting as exclusive sales agent. Both light and dense ash will be available. The new mining and refining operation is located over a vast deposit of Trona.

• Price of Pluronics Reduced

Wyandotte Chemicals Corporation has announced lower prices, effective June 8, for carload, truckload and mixed car quantities of Pluronics, Wyandotte's new nonionic detergent series.

Prices (foo Wyandotte, Mich) are as follows:

L44, 61, 62, 64

55 gal steel drums.....42.5c per lb

Truckload or carload.....38.5c per lb

F68 Flake

55 gal steel Leverpak drum 48.5c per lb

Truckload or carload.....43.5c per lb

Currently, the Pluronics series consists of the following grades: F68, a 100% active, nonionic flake detergent; L44, L64, L61 and L62, 100% active, liquid nonionics developed for specfic types of applications. They differ primarily in hydrophobic-hydrophilic properties.

• U S Testing Names Canadian Agent

The appointment of W J Westaway Co, Ltd of Hamilton, Ontario as aCnadian agents for the United States Testing Company, Hoboken, N J, was recently announced. The appointment marks the first representation of USTC by an agent. Westaway will handle the sale of instruments and tints.

• American Polymer Accelerating Program

As part of an accelerated program to expand its production, research and technical service facilities, the American Polymer Corporation, Peabody, Mass, has announced the appointment of Morell Marean to the position of Sales Manager. For the past several years, Mr Marean has been Detroit District Manager for Du Pont's Electrochemicals Department.

While temporary changes and capacity operation of American Polymer's and its affiliate American Monomer Corporation's plants in Peabody and Leominster, Mass, and Illiopolis, Ill have enabled the company to compensate for the interruption in production resulting from the recent explosion in one of their plants, the program also includes the construction of a new plant. Completion is scheduled for September.

Pending completion of the plant, American Polymer announces that it is making prompt deliveries on all orders from existing facilities.

• New Celanese Chemical Division Sales Office

The Chemical Division of Celanese Corporation of America has established a new sales office at 1422 Euclid Avenue, Cleveland, Ohio. The office is under the direction of Richard A Schwab, Sales District Manager, who was in charge of the Detroit office which closed on July 1.

• Dexter Sales Conference Set for July 13-14

A two-day sales conference will be held July 13 and 14 by Dexter Chemical Corp, New York, at the New Weston Hotel. Normally, these conferences are held in conjunction with AATCC national conventions, but several important product developments and other vital matters must be taken up before September with the sales staff, it is announced.

• 53rd Commencement, NBTI

New Bedford Textile Institute, at the 53rd commencement exercises on June 5, awarded 54 Bachelor of Science degrees and 18 diplomas or certificates, with President John E Foster making the presentations. John A Shea, president of the NBTI Board of Trustees presided.

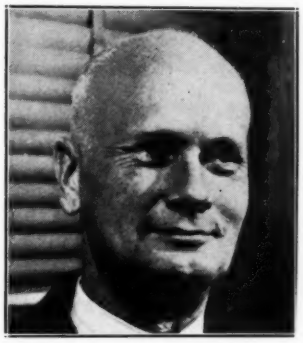
Seabury Stanton, president and treasurer of Hathaway Manufacturing Co delivered the commencement address entitled, "What Industry Expects of Textile College Graduates."

The invocation and the benediction were given by the Rev Alfred R Forni, pastor of Saint Francis of Assisi Church in New Bedford.

NAMES IN THE NEWS

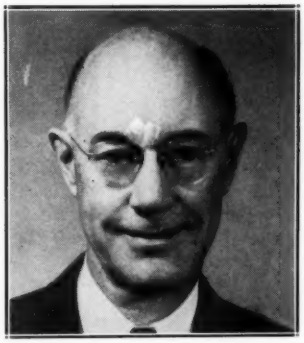
J Frye

J C Franklin



J H Hilldring

S H Williams



W Paul

J P McGuire

NINE new Directors were elected and six others reelected to the Board of the General Aniline & Film Corporation at the annual meeting of stockholders on May 20th, with the selection being made by Attorney General Herbert Brownell, Jr, as custodian of 98% of the voting stock. In addition, six others were re-elected.

In order to give management a larger voice in the direction of the affairs of the Company, three vice presidents of GAF were among the nine new directors: JAMES FORRESTAL, vice president in charge of Ansco and Ozalid Divisions; JOHN C FRANKLIN, Executive Vice President, General Dyestuff Corporation; and FRANCIS A GIBBONS, Vice President and Treasurer of GAF. The others include: NORMAN H BILTZ, Reno, Nevada; ELMER H BOBST, President, Warner - Hudnut, Inc; MELVIN C EATON, President, Norwich Pharmacal Company; JOHN P MAGUIRE, President, John P Maguire & Co, Inc; WINSTON PAUL, President of Domestic Exploration Corp; and G SCHUYLER TARBELL, Jr, Attorney.

Re-elected Directors were JACK FRYE, President of GAF; T COLBURN DAVIS, Board Chairman, Missouri Pacific Railroad Company; HORACE C FLANIGAN, President, Manufacturers Trust Company; ROBERT HELLER, President, Robert Heller Associates, Cleveland, Ohio; THOMAS A MORGAN, New York, N Y; FRED H RHODES, Director, School of Chemical and Metallurgical Engineering, Cornell University.

At the stockholders meeting of General Dyestuff Corporation, representatives of the Attorney General re-elected five present members of the Board of Directors, consisting of Mr Frye, Mr Biltz, and also JOHN D SMALL, Vice President, Pressed Steel Car Company Inc, and A C SPURR, President, Monongahela Power Company, Fairmont, W Va, and Mr Franklin. They elected as new Directors: Mr Maguire; Mr Paul; JOHN H HILLDRING, Vice President and General Manager, Foreign Operations, General Aniline & Film Corporation; and S H WILLIAMS, Vice President and General Sales Manager of General Dyestuff Corporation.

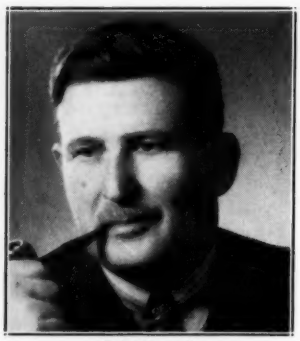
At the organization meeting of the GAF Board, Mr Paul was elected Chairman, thereby providing improved co-ordination between the Alien Property Office of the Dept of Justice and the GAF management and Board. He will also assist the Justice Dept with respect to the return of GAF and GDC to private American ownership.

Mr Frye was re-elected President, the position he has held since 1947. He will serve as Chief Executive Officer and Chairman of the Executive Committee of GAF and General Dyestuff Corporation.

At the meeting of the Board of General Dyestuff, Mr Paul was elected Chairman of its Board and Mr Frye, President; Mr Franklin was re-elected Executive Vice President and Mr Williams, Vice President and General Sales Manager.

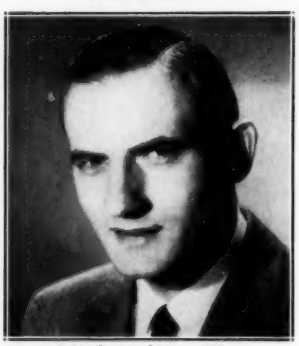
Mr Paul will serve as Chairman of the Boards of both Corporations without compensation.

Other officers of GAF and GDC were re-elected and FRANCIS A GIBBONS was elected to GAF's newly created post of Vice President-Finance. Reporting to him will be the newly appointed Treasurer, A E HENDERSHOT and Controller, W A HENSEL.



E E Brand

R Cubicciotti



H Sonneborn, III

THE Board of Directors of L Sonneborn Sons, Inc, have named EDGAR E BRAND and RUDOLPH CUBICCIOTTI as Vice Presidents and HENRY SONNEBORN, III as Secretary. All of the newly elected additional officers have been associated with the Company for many years.

L Sonneborn Sons, Inc, refiners of petroleum and manufacturers of chemicals, is celebrating its fiftieth anniversary this year.

L K FITZGERALD has been named General Superintendent of Dan River Mills, where he will be responsible for all manufacturing and finishing operations. Reporting to him will be the heads of the engineering, personnel, research, production control and quality control departments.

Mr Fitzgerald replaces RAYMOND HENDERSON, who recently resigned.

WILLIAM C FOSTER, former Deputy Secretary of Defense, the Administrator of ECA, and President of the Pressed and Welded Steel Products Company, was elected as the first full-time President of the Manufacturing Chemists' Association at its 81st Annual Meeting on June 11. Mr Foster will direct Association activities from MCA headquarters in Washington.

Others elected to MCA offices are as follows:

Chairman of the Board—CHARLES S MUNSON, Air Reduction Company

Vice-Chairman—F J EMMERICH, Allied Chemical & Dye Corporation

Vice-Presidents — PAUL L DAVIES, Food Machinery and Chemical Corporation and KENNETH C TOWE, American Cyanamid Company

Secretary-Treasurer—M F CRASS, JR

New directors elected for the term expiring May 31, 1956 are: STANLEY CROSSLAND, Ethyl Corporation; R L HOCKLEY, Davison Chemical Corporation; HOWARD S BUNN, Union Carbide and Carbon Corporation; JOHN R HOOVER, The B F Goodrich Chemical Company; WALTER DANNENBAUM, E I du Pont de Nemours & Company, Inc; JAMES J KERRIGAN, Merck & Co; THOMAS S NICHOLS, Mathieson Chemical Company; E W REID, Corn Products Refining Company; J ALBERT WOODS, Commercial Solvents Corporation.

CARL A GERSTACKER of The Dow Chemical Company was elected a director and the term of ROTHE WEIGEL of Victor Chemical Works was extended a year to fill vacancies.

ELMER WARD, president of Goodall-Sanford and the Palm Beach Company, has been appointed to the Textile Advisory Board at Lowell Tech.

FOOD MACHINERY AND CHEMICAL CORPORATION has announced the appointment of FRANKLIN FARLEY as Management Consultant to its Chemical Divisions Administrative Staff in New York City.

Mr Farley's business experience includes service with Arthur D Little, Inc, Cambridge, Mass; the Phosphate Mining Company, of which he was Treasurer and in charge of operations; and, for the past twelve years, as Vice President in charge of the Phosphate Division of International Minerals & Chemical Corporation, Chicago, Illinois.

Mr Farley's headquarters will be located at the offices of the FMC Chemical Divisions Administrative Staff, Chrysler Building East, 161 East 42nd Street, New York, N Y.

J R Bonnar

H F Herrmann

D E Marnon

A REALIGNMENT of key personnel was announced last month by General Dyestuff Corporation with J ROBERT BONNAR being named Sales Manager, Dyestuff Division; HENRY F HERRMANN, General Market Manager, Dyestuff Division; and DONALD E MARNON, Manager, Dyestuff Technical Department.

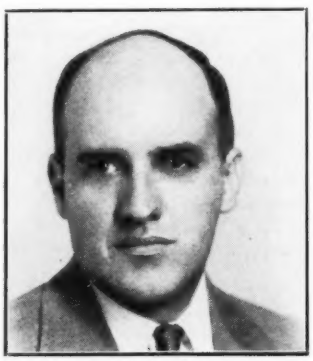
Mr Bonnar has been associated with GDC since 1935, most recently as Manager of the Dyestuff Technical Division.

Mr Herrmann has had an outstanding career in the dyestuff industry, serving GDC as Manager of Sales Services prior to his latest appointment.

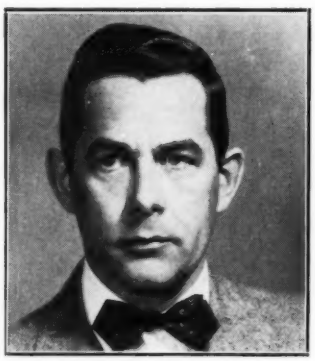
Mr Marnon, co-inventor of the Marhen Process for controlled vat dyeing, joined GDC in May 1951 as assistant to the manager, Dyestuff Technical Department.

(L to r): R Tull, T H Roberts, W C Cobb

H B McClure



B J Garceau



W L Wurster

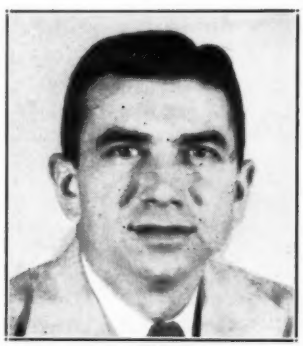
C A Setterstrom

FOLLOWING the Annual Stockholders Meeting of Arnold, Hoffman & Co, Inc, held in Providence, R I recently, Edwin H Arnold, President of the firm, announced the following corporate changes:

W CHESTER COBB has been promoted to Commercial Vice President to direct the Company's Sales, Purchasing, and Sales Service laboratories. THOMAS H ROBERTS was elevated to the position of Technical Vice President to head up the manufacturing, research and engineering activities of the firm. REID TULL, former Sales Manager of Arnold, Hoffman's Teterboro, New Jersey office, was appointed to the post of Sales Manager of the Company, with headquarters in Providence, R I.

Other recent personnel moves include the respective appointments of BERTRAM J GARCEAU as Assistant Research Director and WARREN L WURSTER as Works Manager of the Harkness & Cowing Division. Mr Garceau will be in charge of the Providence Research Laboratory while Mr Wurster will assume responsibility for operations at the H & C plant in Cincinnati. Mr Wurster succeeds CLARKSON C TAYLOR, who on July 1st retired from active service with the Company. Mr Taylor, however, will continue in an advisory capacity.

Two new additions to Ahco's sales staff include G ALLAN DICKSON and LOWELL SHIVE. Mr Dickson is covering New Jersey, parts of New York and Western Connecticut from the Teterboro, N J, office. Mr Shive began contacting accounts in Tennessee on June 1.



L Shive

HAROLD HALVORSEN has been appointed Head of the Mixed Fiber Department of General Dyestuff Corporation. Mr Halvorsen, who has been with GDC for nearly twenty years, succeeds to the position left vacant by the recent death of ULRICH HUTTEN.

In another change, RICHARD HALL, employed by GDC for the past sixteen years, was appointed Head of the Napthol Department. Both Messrs Halvorsen and Hall will serve under LAWRENCE THOMPSON, Technical Manager of the Cotton Section.

UNION CARBIDE AND CARBON CORPORATION has announced the following significant personnel developments in two of its divisions:

Bakelite Company

GEORGE C MILLER has been appointed President, succeeding H S BUNN, who, in turn, succeeds the late J W McLAUGHLIN as Chairman of Bakelite and as a member of the Appropriations Committee of Union Carbide.

Carbide and Carbon Chemicals Company

HARRY B McCLURE has been named Executive Vice-President. Since 1944 Mr McClure had been Vice-President.

Textile Fibers Division—CARL A SETTERSTROM has been appointed General Manager. He had been Sales Manager of this Division, and, before this, Product Manager of Carbide's Fine Chemicals Division.

Consumer Products Department—R E DALEY is the new Manager, moving up from the position of Assistant Sales Manager of the Industrial Chemicals Division.

Industrial Chemicals Division—JOHN CONWAY replaces Mr Daley as Assistant Sales Manager. Mr Conway was previously Assistant Manager of the Fine Chemicals Division.

W I McNEILL, Vice President-Controller of General Aniline & Film Corporation, has resigned after over ten years of service with the Company to become a private management consultant.

J A Chew

JOHN A CHEW, head of the New York firm bearing his name, was honored May 26th by more than 300 friends in the chemical industry with a testimonial dinner at the Hotel Roosevelt, New York. JOSEPH M WAFER, West Virginia Pulp & Paper Co, was in charge of arrangements.

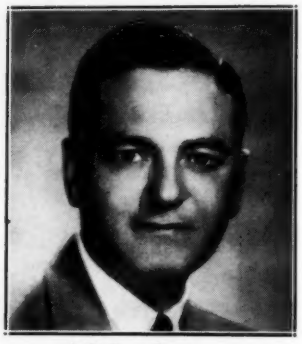
CHARLES S MUNSON, chairman of the board of Air Reduction Company, and president of the Manufacturing Chemists Association, has been chosen to receive the Chemical Industry Medal for 1953, according to an announcement made by the American Section of the Society of Chemical Industry, donor of the medal. The medal will be formally presented to Mr Munson at a meeting of the American Section following a dinner in the medalist's honor at the Starlight Roof of the Waldorf Astoria Hotel, New York, on October 30.

The Chemical Industry Medal was established in 1933 and is awarded annually in recognition of conspicuous services to applied chemistry. Mr Munson was elected to receive the medal by the Executive Committee of the American Section of the Society of Chemical Industry sitting as the committee of the award.

Harry B McClure, vice president of the Carbide & Carbon Chemicals Company, will present the medal. Lauren B Hitchcock, president of the National Dairies Research Corporation and chairman-elect of the American Section, will preside at the award meeting.

R J SMITH succeeds L G LAWRIE as head of the Publicity Department of Imperial Chemical Industries Ltd, Dyestuffs Division.

Mr Smith joined the Dyehouse Department of ICI's Dyestuff Division in 1933. He was appointed Assistant Chief Colorist in 1950. He has been active in the Society of Dyers and Colourists and, particularly, the Textile Institute, which society awarded him the Service Medal in 1952.



A R Broadman

RECENT moves by Heyden Chemical Corporation include the election of ARTHUR R BROADMAN as vice president of engineering and purchasing, and ERNEST G KUEHN as vice president of Heyden Export Corporation. Mr Kuehn has also been appointed Manager of Heyden's Export Division. It has also been announced that JAMES R BODINE has joined the Market Development Department.

Mr Broadman has been assistant vice president of Heyden in charge of engineering since 1948 and is a director of St Maurice Chemicals, Ltd. Mr Kuehn has been Manager of the Latin-American Export Department since 1948. Mr Bodine for the past six years was associated with the Market Research Department of Merck and Company.

GEORGE O LANGLAIS has been added to the staff of the Lowell Technological Institute Research Foundation as a Research Associate. Prior to a return to active duty with the U S Navy, which he completed early this year, Mr Langlois had spent four years with Monsanto Chemical Company.

HAROLD W ELLEY, Technical Director of the Organic Chemicals Department, E I du Pont de Nemours & Co, Inc, is currently heading the national campaign of the 1953 Mental Health Fund, which began in May.

Dr Elley, whose company has been carrying on an industrial mental health program for several years, has been active in the mental health field since 1946 and is now chairman of the board of the National Association for Mental Health.

He announced that a $5,000,000 goal had been set for the campaign, the first national fund-raising effort of the association and the 250 state and local organizations associated with it.

JOHN R LYONS has been named Technical Representative for Sindar Corporation, New York. Mr Lyons comes to Sindar from the Pacific Chemical and Fertilizer Company, where he served in the same capacity.

L A Kluger

LAWRENCE A KLUGER has joined the Sales Staff of the Paterson Branch of American Aniline Products, Inc.

For the past several years Mr Kluger has been assistant technical director of the company's Paterson laboratory facilities. Previously he was associated with his father in several textile finishing enterprises in the Paterson area.

Mr Kluger's territory will encompass Paterson and Metropolitan New York.

EDWARD J ALBERT, Thwing-Albert Instrument Company, was elected president of the Scientific Apparatus Makers Association at the group's annual meeting held recently at White Sulphur Springs, W Va. He succeeds J CLAIRE EVANS, chairman of the board, Denver Fire Clay Company, who served as president of the apparatus makers for two terms.

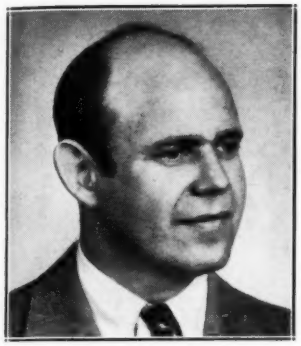
L B SWIFT, Taylor Instrument Companies, was elected president pro-tempore of SAMA and T M MINTS, E H Sargent & Companies, was re-elected treasurer.

New section chairmen include E J RHEIN, Kimble Glass Company, *laboratory apparatus section;* L B McKINLEY, Bausch & Lomb Optical Company, *optical section* and P R BASSETT, Sperry Gyroscope Company, *nautical, aeronautical and military instrument section.*

The following were re-elected chairmen of their sections: G A DOWNSBROUGH, Boonton Radio Corporation, *industrial instruments;* O L LETHANDER, Leonard Peterson & Company, Inc, *laboratory equipment;* and HENRY F DEVER, Minneapolis-Honeywell Regulator Company, Brown Instrument Division, *recorder-controller section.*

WALTER F FANCOURT, III, vice-president of W Fancourt Company, Philadelphia, was elected President of Phi Psi, national textile fraternity, at the Society's 50th anniversary convention, held May 7-9 at the Penn Sheraton Hotel, Philadelphia. He succeeds M EARL HEARD, West Point Mfg Co.

WILLARD A COLBY, Emery Industries, Inc, was elected vice-president.



E A Zillessen

STANLEY W FREEMAN has been appointed manager of the Providence office of the Fine Chemicals Division, Pittsburgh Coke & Chemical Co, and will also serve as sales representative in the New England territory. His new office is located at 336 Allens Ave, Providence, R I. Mr Freeman's previous affiliations were with General Dyestuff Corporation and the Providence Dyeing, Bleaching and Calendering Co.

ERNEST A ZILLESSEN will serve as sales representative for the Fine Chemicals Division in Northern New Jersey (from Essex Falls) and parts of North Carolina (from the Company's offices in Charlotte). Mr Zillessen was most recently a partner in the Silk City Chemical Company of Paterson, N J.

ROY H LANDIS has moved into the newly created post of sales manager of organic chemicals for the Nitrogen Division, Allied Chemical & Dye Corporation. Prior to joining Allied's Market Development Department in November, 1952, he was acting manager of the Synthetic Organic Chemicals Department of American Cyanamid Co.

In Allied's Solvay Process Division, the following promotions have been announced:

E R OSWALD succeeds the late CHARLES A SMITH as manager of the Export Department; RAYMOND B ANTHONY has been named Assistant Manager of the Special Alkalies Section; F P BOEHM is now Assistant Manager, Ammonium & Potassium Products Section; and ROBERT L REYNOLDS moves up to Technical Assistant to the Manager of the Special Alkalies Section. All four appointees will make their headquarters in New York.

CLARENCE N FERGUSON has joined Bjorksten Research Laboratories, Inc as a research chemist. He will be located at the Madison Laboratories, where he will do exploratory research on nonwoven fabric.

S O Rose

SAMUEL O ROSE of Grove Park, Burlington, N C, has accepted a position with Onyx Oil and Chemical Company, Jersey City, N J, as Southern sales representative to the full-fashioned and circular knit hosiery and hosiery yarn dyeing industries in the Piedmont section.

For the past eight years, Mr Rose has been employed as head dyer for the Full Knit Hosiery Co, a division of Chadbourne Hosiery Mills. Prior to this, he had thirteen years experience at various supervisory capacities for Melrose Hosiery Co and Amos Hosiery Co in High Point, and Standard Hosiery in Burlington.

ALLEN ABRAMS, Marathon Corporation, Rothschild, Wis, has been elected President of the Industrial Research Institute, Inc. HOWARD G VESPER, California Research Corporation, San Francisco, Calif, was elected Institute Vice President and President Elect. CHARLES G WORTHINGTON was re-elected Secretary-Treasurer. The elections were held at the fifteenth annual meeting of the Industrial Research Institute at White Sulphur Springs, W Va.

New members of the Institute Board of Directors, elected for three-year terms, are EMIL OTT, Hercules Powder Company, Inc; E DUER REEVES, Standard Oil Development Company; and THOMAS H VAUGHN, Wyandotte Chemicals Corporation.

The 1953 Medal of the Institute, awarded for outstanding accomplishment in the management of industrial research, was presented to EGER VAUGHAN MURPHREE, President, Standard Oil Development Company.

THE appointment of DONOVAN J GRAY as controller of Wyandotte Chemicals Corporation became effective May 1.

Mr Gray, 43, has been controller of the L A Young Spring and Wire Corporation since 1947. Prior to that time he functioned in various accounting capacities with West Coast concerns until 1934 when he joined L A Young in Detroit.

J R Burkett

JOHN R BURKETT, formerly Assistant to the Manager, Dyestuff Sales, American Cyanamid Company, Calco Chemical Division, began managing the business of the Calco Chemical Division in Canada, North American Cyanamid Limited, on July 1.

R S DICKS, formerly senior process engineer for the Shell Oil Company, has joined the Textile Division of Celanese Corporation of America. In collaboration with KENNETH D BOWEN, Director of Manufacturing Co-ordination, he will direct the process engineering section in a study of the productivity of all chemical processing equipment in Textile Division plants.

WILLIAM B SINCLAIR, formerly with the Westvaco Chemical Division of Food Machinery and Chemical Corporation, has been appointed New England Sales representative of Celanese's Chemical Division with headquarters at 140 Federal Street, Boston, Mass.

JANE NEGBAUR has been named Fashion Coordinator of the Textile Resin Department of American Cyanamid Company. Miss Negbaur, who formerly handled fashion coordination and publicity for I Miller and Sons, will devote the greater part of her efforts to the New York market.

ALBERT SCHARWACHTER, for several years Sales Manager for Arizona Chemical Company, has been elected vice president of the firm, which is jointly owned by International Paper Company and American Cyanamid Company. Recently re-elected President of the Tall Oil Association, Mr Scharwachter has been active in the tall oil business since Arizona began producing the product in 1946.

H DOUGLAS SPRUANCE has been named Arizona's Technical Sales Representative for the Mid-West, with headquarters at Cyanamid's office and warehouse at 3505 N Kimball Avenue, Chicago 18, Ill.

C J Kintner

APPOINTMENT of CHARLES J KINTNER as an "Everglaze" field representative of Joseph Bancroft and Sons Company, Wilmington, Del, has been announced.

Maintaining headquarters in New York, Mr Kintner will be the "Everglaze" field representative in Connecticut, New Jersey, New York and Pennsylvania. His new duties include the rendering of technical advice and service to present "Everglaze" licensees in that area and determining that prospective licensees are qualified to meet "Everglaze" standards established by the Bancroft Company.

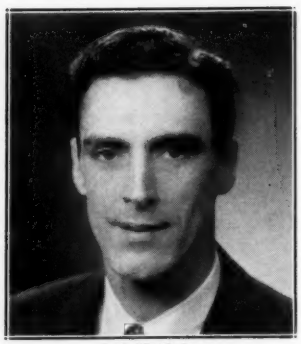
Prior to joining the Bancroft organization in 1944, Mr Kintner was associated with the Ridbo Laboratories of Nutley and Paterson, New Jersey.

NEW members to the Board of Trustees of The Philadelphia Textile Institute Foundation include:

H HOWARD COLEHOWER, JR, President of the C Walker Jones Company, Philadelphia; MICHAEL DAROFF, President, H Daroff and Sons, Inc, Philadelphia; EDWARD L ESPEN, Vice President, Moss Rose Manufacturing Company, Philadelphia; EDWIN G MICHIE, Vice President, Andrew Y Michie and Sons, Philadelphia; PHILIP J SCHLOSSER, President, Schlosser Manufacturing Company, Philadelphia; HARRY A SOVEL, Treasurer, Quaker Pile Fabric Corporation, Philadelphia; and WILLIAM ZIMMERMAN, President, John Zimmerman and Sons, Philadelphia.

To the Board of Trustees of the Philadelphia Textile Institute, the following have been elected: CHARLES W CARVIN, President, Charles W Carvin Co, New York; ROBERT L HUFFINES, JR, President, Textron, Inc, New York; and JACQUES WEBER, President, Bloomsburg Mills, Inc, Bloomsburg, Pa.

RUSSELL L LAWSON, formerly vice president of the Utica (N Y) Knitting Company, has been named executive vice president of Central Scientific Company, a wholly owned subsidiary of Cenco Corporation.



J J Kelleher

JOHN J KELLEHER has been named to the technical sales staff of The Hilton-Davis Chemical Company, representing the company to the textile trade.

Mr Kelleher, who will call on textile mills in New York, New Jersey and Pennsylvania, will make his headquarters at 1450 Broadway, New York, the home office of Sterling Drug, Inc. In addition to his sales duties, he will service mill problems relating to textile dyeing and finishing.

SELBY B GROFF, former treasurer of Wamesit Wool Processing Co and Wamesit Woolen Mills of Wamesit, Mass, has purchased all outstanding stock of the above companies, making him sole owner. Mr Groff is now President and Treasurer; JOSEPH G DUFFY is Vice President in charge of sales; OLIVER K COMPTON, Ass't Treasurer and Plant Manager; FRANKLIN P SWAIN, Ass't to President, and sales representative of the Middle Atlantic states; and PAUL ST ARNAUD, Secretary.

Wamesit Wool Processing is engaged in the scouring and blending of wool. Laird, Ridge & Co, Inc, of Philadelphia is the sales representative in Southern United States.

F H GUERNSEY, for many years prominently identified in the soap and sanitary chemical fields, has been appointed Eastern District Sales Manager for Universal Detergents, Inc, Long Beach, Calif, producers of long-chain alkyl aryl sulfonate products.

Mr Guernsey will continue to make his headquarters in New York City.

HERMAN CONE, chairman of the board and president of the Cone Mills Corporation, was awarded an honorary degree of Doctor of Textile Science by North Carolina State College during the college's 1953 commencement program on June 7.

The degree was conferred by Chancellor J W Harrelson of State College. Dean Malcolm E Campbell of the college's School of Textiles presented Mr Cone and read the degree citation in his honor.

A R Hoover, III

A R HOOVER, III will service accounts in the Carolinas as Southern representative for Kali Manufacturing Company, Philadelphia. Mr Hoover has had particular association with the full-fashioned hosiery field.

SAMUEL BREITER, prominent textile financier, has accepted the chairmanship of the drive to be conducted this year on behalf of the Joint Defense Appeal by Gotham Lodge of B'nai B'rith and the Coordinated Council of Wholesale Dry Goods Distributors. IRVING KLEIN of the Big Four Merchandise Co is co-chairman of the effort.

ABNER C HOPKINS, JR has been appointed Director of Chemical Sales for the Chemical Division of General Mills. He will be headquartered temporarily at the General Mills general offices in Minneapolis, before establishing his office at the company's chemoil plant in Kankakee, Ill.

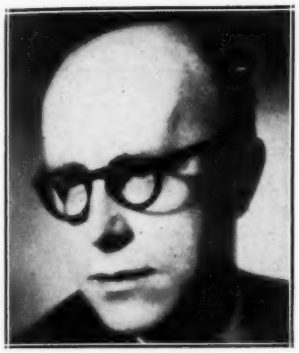
Hopkins was formerly Director of Commercial Chemical Development at the General Mills research laboratories in Minneapolis, a position he held since joining the company a year ago.

JOHN H KEMP, who has been associated with Reeves Bros, Inc, for the past year as a fabric development technician, went to work on June 1 in the Converting Relations Department of American Viscose Corporation.

Mr Kemp formerly was with Du Pont as a dyeing and finishing specialist, and also the Rossville Dyestuff Co, Staten Island, N Y.

ROBERT R DEAN has joined the Technical Sales Staff, Westvaco Chemical Division, Food Machinery & Chemical Corporation, New York, where he will work upon special development assignments.

Mr Dean has been associated with Virginia-Carolina Chemical Corporation, Diamond Alkali Company, American Cyanamid Company and Johns-Manville, Incorporated.



H H de Vallee

HENRY H de VALLEE, former president of Francolor Inc, vice president of the French Chamber of Commerce, and delegate to the International Materials Conference, has joined The Mercantile Metal & Ore Corporation, New York, N Y, as manager of the Chemical Division.

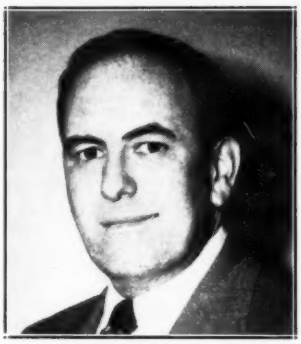
H O KAUFFMAN, formerly Research Director of the Buffalo Electro-Chemical Company, Inc, has been promoted to Technical Director.

Other key personnel in the Research and Development Department are: E S SHANLEY, Assistant Technical Director and Manager of Inorganic and Physical Chemical Research; P H MARGULIES, Technical Information and Patents; L H DAWSEY, Manager of Process Research; F P GREENSPAN, Manager of Organic Research and Development; R L McEWEN, Manager of Pulp and Paper Research and Development; and B K EASTON, Supervisor of Textile Research and Development.

AT THE recent meeting of Textile School Deans at Panama City Beach, Florida, a new organization, The National Council for Textile Education, was formed, succeeding the National Council of Textile School Deans.

Elected President of the new Council was G NATHAN REED, dean of faculty at Lowell Technological Institute. The other officers elected at the organization meeting are LACONLA H HANCE, vice president of the Institute of Textile Technology, who will serve as vice president; CLEVELAND L ADAMS, head of the School of Textile Technology at Alabama Polytechnic Institute, who will be the organization's secretary; and EDWARD PICKARD of Kent, Connecticut, who was elected treasurer.

CARLETON PRESCOTT has joined the dyeing staff of Duffen Dye Works, Portsmouth, Va. Mr Prescott was formerly associated with the Newmarket Mfg Co.



J F Nichols

JOSEPH F NICHOLS on June 1 began serving Finetex, Inc as technical sales representative in the Pennsylvania territory. He comes to Finetex, Inc, specialty chemical manufacturers, from the Goodman and Theise Company, Scranton, Pa.

LAUREN B HITCHCOCK, President of the National Dairies Research Corporation, Oakdale, N Y, has been elected Honorary Chairman of the American Section, Society of Chemical Industry, for the year 1953-1954, succeeding HARRY B McCLURE, Carbide & Carbon Chemicals Corporation.

Other officers elected were: *Honorary Vice Chairman,* CLIFFORD F RASSWEILER, Johns-Manville Corporation; *Honorary Treasurer,* CECIL L BROWN, Standard Oil Development Co; *Honorary Comptroller,* ROBERT HEGGIE, American Chicle Company; *Honorary Secretary,* ANTHONY L CARRAD, Imperial Chemical Industries (New York) Ltd.

Members of the Executive Committee elected for three years: ROBERT M BURNS, Bell Telephone Laboratories; PAUL D V MANNING, International Minerals & Chemicals Corp; MONROE E SPAGHT, Shell Oil Company; JOHN M TINKER, E I du Pont de Nemours & Co.

Others who continue as members of the Executive Committee are: BRADLEY DEWEY, JR, Dewey & Almy Chemical Co; RAY P DINSMORE, Goodyear Tire & Rubber Co; W W DUECKER, Texas Gulf Sulphur Co; ALBERT L ELDER, Corn Products Refining Co; L P MOORE, American Cyanamid Co; EMIL OTT, Hercules Powder Co; RAYMOND STEVENS, Arthur D Little, Inc; ALEX STEWART, National Lead Co; and Mr McClure.

FRANCIS R RODY has been named sales manager of the Textile Oil Division of Masury-Young Company, Boston, Mass, succeeding the late Harry L Drew (see obituary).

Mr Rody spent 13 years with American Woolen Company before joining Masury-Young in 1942.

E D Lind

EDWARD D LIND has been appointed Manager of the New York Branch Sales of Ciba Company, Inc. Mr Lind has been associated with Ciba for many years in both technical and sales positions.

Mr Lind will maintain headquarters at the Ciba Company, Inc, offices at 627 Greenwich Street, New York 14, New York.

FOUR honorary degrees were awarded at the seventieth commencement exercises of the Philadelphia Textile Institute held in Germantown, Pa on June 13th.

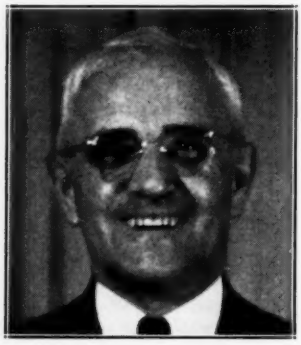
Those receiving degrees included C SCOTT ALTHOUSE, Althouse Chemical Company, *Doctor of Textile Science;* LEROY EDGAR CHAPMAN, Pennsylvania State Senator, *Doctor of Humane Letters;* ISRAEL STIEFEL, Pennsylvania State Senator, *Doctor of Humane Letters,* and ELMER L WARD, Goodall-Sanford, Inc, *Doctor of Textiles.* Mr Ward was the principal speaker at the commencement exercises.

This year's graduating class numbered 83 seniors who were awarded Bachelor of Science Degrees in textile engineering and chemistry and dyeing. Included among the seniors were 13 students from 12 foreign countries.

HOOKER ELECTROCHEMICAL COMPANY has announced the appointments of GEORGE J BRUYN as administrative assistant to the general sales manager and WOLFORD M EWALT as Special Products Supervisor in the Niagara Sales Office. Mr Bruyn has just returned to the Company from Washington, where he served with the National Production Authority, most recently as Chief of the Inorganic and Agricultural Chemicals Branch of NPA. Mr Ewalt for the past 2½ years has been in charge of technical correspondence in the Technical Service Division of the Sales Department.

The Company has also announced the promotion of JOHN T WALMSLEY to the Chicago and Mid-West area as a salesman. His headquarters will be at 1 LaSalle St, Chicago. Since June of last year he has been in the Niagara Falls Sales Office.

OBITUARY



W Cummings

WILLIAM CUMMINGS

WILLIAM CUMMINGS, one of the oldest employees of E F Drew & Co, Inc, died at his home in Freeport, N Y, on May 1st.

Mr Cummings first joined the Drew organization forty years ago in Boston as textile auxiliary products representative in New England. He became manager of the Philadelphia office and later returned to New England to handle, in addition to textile chemcials, fatty acids, plasticizers and other intermediate chemicals derived from fats.

Mr Cummings lived for many years in Springfield, Mass, where he has been laid to rest alongside his wife. A son and daughter survive him.

HARRY L DREW

HARRY L DREW, vice president in charge of the Textile Oil Division, Masury-Young Company, Boston, Mass, died on May 12.

Mr Drew recently celebrated his 30th anniversary with Masury-Young. An expert in textile oils, he was prominent in the garment and woolen trades.

ALEXANDER F IX

ALEXANDER F IX, President of Frank Ix & Sons, Inc, and President of the National Federation of Textiles, Inc, died suddenly at his home in Englewood, N J, Wednesday morning, April 29, at the age of 58.

Mr Ix spent his entire business career in his family firm. His four brothers shared with him the development of the enterprise started by his father, Frank Ix, Sr, who survives him.

JAMES W McLAUGHLIN

JAMES W McLAUGHLIN, Vice-President, Union Carbide and Carbon Corporation, died suddenly on May 15 at his home in New Rochelle, N Y. He was 62.

Mr McLaughlin was Chairman, Bakelite Company and Bakelite Company (Canada), Limited; Vice-President, Carbide and Carbon Chemicals Company; and Vice-President and Director, Carbide and Carbon Chemicals Company, Limited—all associated with Union Carbide.

Mr McLaughlin began his career as an engineer with Peoples Gas, Light and Coke Company, Chicago, in 1914, where he continued until December, 1918 and, at the time of his resignation, was Assistant Superintendent of North Station. In December, 1918, he was appointed Superintendent of the Hammond, Indiana, acetylene plant of The Prest-O-Lite Company, Inc. He was associated for many years with various Prest-O-Lite and Linde Air Products Company plants in the midwest and on the Pacific Coast, all of which were early operations of Union Carbide. In 1927 he was transferred to the South Charleston, W Va, plant of Carbide and Carbon Chemicals Company, where he became Assistant Superintendent. In 1929 Mr McLaughlin became General Superintendent of the Chemicals Company plants, and in 1931 he was made Vice-President of Carbide and Carbon Chemicals Company in New York. In this capacity he became associated with the plastics activities of the Company, and, in 1944, he was made President of Bakelite Company. A year later, in 1945, he was elected Vice-President, Union Carbide and Carbon Corporation, and in 1952 he became Chairman of Bakelite Company.

FREDERICK B SMITH

FREDERICK B SMITH, a technician with the Arthur Kahn Company, Inc, New York converters, died on May 18th.

The son of William C Smith, a prominent textile designer, Mr Smith began his textile career with the old silk firm of Jansen & Pretzfeld Co. He later served successively with Henry Doherty Co, the Astoria Silk Works (as general manager), and the Celanese Corporation of America (fabric development work) before forming his own firm. He joined Arthur Kahn initially in 1941, but left to go with Burgess Fabrics Corp and later, A D Julliard & Co in 1944. He rejoined Arthur Kahn in 1949.

Mr Smith was active in the founding of the AATT and was also a member of the AATCC, New York Section.

H W Matthews

HOWARD W MATTHEWS

HOWARD W MATTHEWS, 55, vice-president, Turbo Machine Co, Lansdale, Pa, died on May 26th at Temple University Hospital, Philadelphia.

Mr Matthews had been with Turbo since it was organized as a subsidiary of Dexdale Hosiery Mills in 1929 and previously had been with Dexdale since 1922.

He was widely known in the hosiery industry for the development of an entirely new principle in the boarding and preboarding of nylon hosiery.

Mr Matthews is survived by his widow, Ethel Kline Matthews, four daughters, one son, three brothers and six sisters.

FERDINAND SONNEBORN

FERDINAND SONNEBORN, founder and president of L Sonneborn Sons, Inc, New York, died June 9 after a long illness. His age was 79.

Born in Breitenbach, Germany, Dr Sonneborn came to this country in 1903 and established the company, which is now celebrating its fiftieth anniversary. An authority on pharmaceutical and industrial derivatives of petroleum, Dr Sonneborn purchased the Daugherty Refinery at Petrolia, Pa, where he produced petrolatum for use in pharmaceutical and cosmetic preparations and for other industrial applications. During World War I, when embargoes prohibited import of white mineral oil from Europe, Dr Sonneborn introduced the refining of this product in the United States. Another refinery at Franklin, Pa, and a factory at Nutley, N J, were purchased to produce the increasing line and volume of the company's products.

Dr Sonneborn attended the Universities of Marburg and Munich in Germany and received his PhD degree from the University of Basle, Switzerland. Last year Basle awarded him an honorary Doctor of Science degree.

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